ELECTRICAL REVIEW

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1st October, 1948

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLIII. No. 3697 1st OCTOBER, 1948 9d. WEEKLY

System Stability

TRANSMISSION OVER LONG DISTANCES

WORLD consumption of electricity is being doubled every ten to twelve years—a rate of progress that necessitates the opening up of hitherto unexploited power resources and the amplification of those already in existence. These measures entail the transmission of larger amounts of power for longer distances and the stiffening of more closely linked networks. They introduce difficulties in regulation which call in question earlier conceptions of the most suitable voltages and current loadings.

Natural Limits

A problem that is rapidly passing from the realm of academic interest to one of almost immediate practical importance concerns the practicability of conveying energy as alternating current from remote generating plants to the points of use. For conventionally designed lines, a natural limit, depending on the square of the voltage and the reactance of the circuit, is set to the amount of power that an overhead line can deliver. Beyond this stability limit, loss of synchronism occurs between the sending and receiving ends as a result of angular displacement of the corresponding voltages due to the reactance of the line.

Operating contingencies call for a limit substantially short of the theoretical maximum to prevent transient conditions, as during short circuits or emergency kVA transfers, from causing the load carried to exceed the permissible value, after leaving enough in hand to cover the reactances of the alternators and transformers. The necessary margin can be lessened by the adoption of means which include quick-response excitation of generators, the use of network analysers and, less desirably, modifications to alternator design. However, most store is, we believe, to be set on reducing the times of circuit interruption through the development of high-speed breakers and relays.

Angular displacement considered in relation to the surge impedance load, as shown in the article on "Electric Power Transmission" which appeared in our issue of 10th September, restricts the distance of point-to-point transmission to about 250 miles. This distance can, however, be materially increased by compensating for the reactance of the line, thus in effect shortening its run to the requisite length. Methods devised for doing so were discussed by Dr. F. Busemann in E.R.A. Technical Report 2/T69, reviewed by us last week, and investigations in hand in various countries indicate that lines can theoretically be stabilized for any distance.

Economic Considerations

The economic aspects are less clear and such methods may prove to be only palliatives. Dr. W. Wanger's contention that it does not pay to increase loading above the surge impedance value supplies a criterion of when to increase the number of parallel circuits (not everywhere feasible) or alternatively to raise the voltage.

A transmission system forming part of an interconnected network (such as the British grid) is inherently more stable, but even then increasingly heavy load

transfers in emergency and the possibility of interlinked power stations tripping off the line (with the introduction of additional reactance due to feeds by roundabout routes) may dangerously reduce the necessary difference between static and operating stability for coping with faults. The construction of a 264-kV line at Staythorpe in Yorkshire is presumably the initial stage of a higher-voltage grid extending from north to south to reinforce the 132-kV system. It may also be regarded as providing experience in devising and constructing very-high-voltage transmission schemes abroad.

CONSULTATIVE COUNCILS

THE first step has been taken towards the establishment of the long awaited Electricity Consultative Councils; the chairmen have been appointed. The majority of them are representatives of local authorities and in some cases are already members of the Electricity Boards for their areas. There are two members of the I.E.E. among them and another three have trade union affiliations; there is also a farmer. There are still something like 200 appointments yet to be made to the Councils. Then the Act adumbrates a system of district committees or representatives to be appointed by the Councils. We shall watch with interest the growth of this somewhat extensive public watchdog.

GOOD INSTALLATIONS

AMONG the new Codes of Practice referred to on page 534 is a long overdue one relating to lightning protection. It was as long ago as 1905 that the last authoritative recommendations were issued on the subject and in the meantime a large amount of knowledge has been accumulated. The new Code governing the selection and installation of domestic electric cookers is of more than technical interest and might be studied with profit by householders who wish to get the most suitable apparatus for their particular circumstances.

COAL CONDITIONS

ABILITY to use a wide range of low-grade coal in power stations is a major economic factor in promoting electrification. The greater the range the better. It is this which gives great importance to the exercise of initiative on the lines of that shown at Burton-on-Trent, as described on p. 504 of this issue. At trifling cost (including that of about 1 per cent of the steam raised) fuel not originally suitable for the plant is now being burned at much higher thermal efficiency to maintain full output (instead of under 70 per cent) and, of equal importance, to give greatly improved boiler availability.

POWER CUT WARNINGS

LAST week's cut in electricity supply was, we believe, unduly disturbing to the public, who fear that when the heavy winter loads have to be met the position will be much worse. Actually, generating plant out of commission for overhaul in the early autumn accounts for an appreciable proportion of the total capacity. A criticism we have heard of the broadcast warnings after the 8 a.m. news is that they are not sharply differentiated from the normal B.B.C. programme and should be given by a different announcer. Another suggestion made is that more prompt action would be taken if consumers were asked to switch off fires, the real sinners, wholly or in part (and not all electrical appliances), the penalty of non-compliance being the risk of losing the rest of their electricity supplies.

SUPERINTENDENTS' SALARIES

ON page 516 a station superintendent sets out the case for better treatment of his class. It is a reasoned and reasonable statement deserving the close attention of the British Electricity Authority which, we are sure, wishes to see ability and responsibility adequately rewarded.

TRAINING SUPPLY ENGINEERS

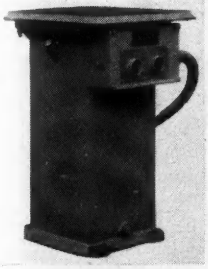
Two themes were prominent in speeches and subsequent discussions at the E.P.E.A. dinner last Saturday. One was the great development in electricity supply that will follow the provision of adequate generating plant, say in five years time. The other was the training of enough young engineers of the right kind to cope with the needs of the situation then. They should be encouraged to take wide views and to bring new ideas to the service. Lord Citrine's view as to the value of an international exchange of students is one that we believe will commend itself to the Association, which from its beginning has given a foremost place in its activities to the advancement of technical education.

Metal Rectifiers

Historical Account of Westinghouse Developments

TWENTY-FIVE years ago the copper-oxide rectifier was patented in Britain and within two years of its introduction to the electrical industry it was being made under licence in several countries.

During the past twenty-one years Westinghouse rectifiers aggregating 250,000 kW have been supplied and this total is being added to at the rate of 20,000 kW each year. A very substantial export business in this class of equipment has been built up.



Oil-immersed "Westalite" for driving variable-speed d.c. motors

Rectifier development has been more closely associated with telecommunications than with any other service. The requirements range from a few microwatts for radio - frequency detection to what will be the largest installation in the world, having outputs of 24,000 A at 32 V and 1,920 A at 180 V, a total of 1,112 kW.

In the test room at Chippenham there is at present equipment which has been made for the B.B.C. transmitters at Washford and Westerglen. The outputs of this equipment are 5A at 250 V for grid bias, 1 A at 500 V for HT·1 and 2·5 A at 3,000 V for HT·2, all outputs being smoothed.

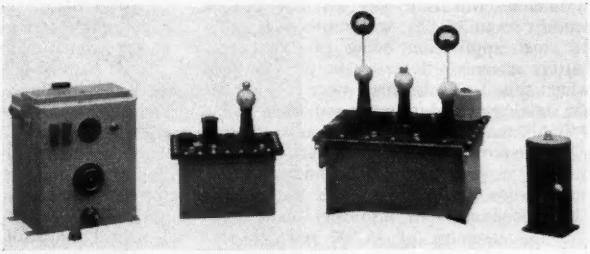
This static converting device was first applied to railway signalling in 1925, for battery charging, the operation of train describers and banner signals as well as track circuiting. In 1927 it was used in the Ferranti trickle charger and the first all-mains Gambrell radio receiver. Small types enabled Everett Edgcumbe and Ernest Turner to adapt d.c. moving coil instruments to indicate a.c. values, so pointing the way to modern a.c.-d.c. test sets. In 1928 a three-phase set was built for driving motors.

Consumers who have only single-phase service but need three-phase supplies often find it less costly to install a one- to three-phase convertor, suitable for loads of up to 100 h.p. of mixed motors, than to lay a long new three-phase service cable. In 1929 a rectifier was used in telephone metering circuits while the first electro-plating plant deriving power in this way was installed in the Chippenham works of what is now the Westinghouse Brake & Signal Co., Ltd.

The equipment provided in 1929 for the operation of d.c. point machines at the Victoria and Exchange railway stations in Manchester is still in everyday use and in that year, too, metal rectification was used for Ferranti dust precipitators at Avonmouth.

In 1930 rectifier-fed motors were driving teleprinters, still current practice, while multi-circuit chargers for radio and car batteries had been designed; the actuation of d.c. brake gear, contactors for a.c. lifts and the re-closing of switchgear followed.

Rectification at radio frequencies was announced in 1932, as second detectors in super-heterodyne receivers, for automatic volume control and as battery economizers. The existing auto-charging emergency battery lighting system in public buildings was adapted in 1933 to the overnight charging of tradesmen's delivery vehicles.



Outfit for d.c. 35-kV pressure testing of power cables

The first fan-cooled rectifiers for heavy duty were introduced in 1934, a 12,000 A equipment for electro-plating being installed by the Hercules Cycle & Motor Co.

Rectifiers made for the electrolytic and

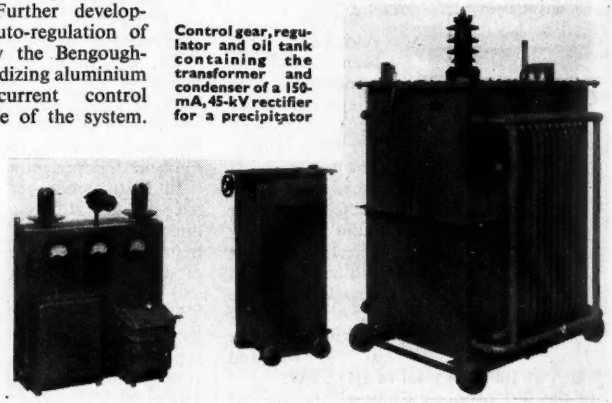
deposition market have an aggregate output of three million amperes, at from 2 to 60 V. Efficiency remains unchanged down to 7 V, at which value over 80 per cent efficiency can be expected from a 1,000-A plating set, complete with its transformer and voltage regulator. Automatic control has received much attention. Plant is in operation which accurately controls the thickness of deposit, with a definite load in the bath; but experimental plant is in use which plates at a constant current density, regardless of the amount of work in the bath. The operator merely loads the vat and the regulator automatically adjusts the rectifier current and voltage output to keep the bath density constant. Further developments include the auto-regulation of voltage and time by the Bengough-Stuart method of anodizing aluminium with over-riding current control throughout the whole of the system.

An outfit to furnish small current at 400,000 V for X-ray equipment was installed in 1935 at the Hammersmith hospital. In the following year a constant potential circuit was patented for operating cinema arc projectors and efforts to obtain a constant output automatically, regardless of changing load and varying input voltage, succeeded with the marketing in 1938 of the "Westat" which is now obtainable with outputs up to 3·6 kW, without moving parts, its chief application being to "floating" battery systems. Some of the principles on which this device is based were utilized for the development during the war years of the "Stabilistor" alternating voltage stabilizer.

The contribution to the war effort, in outputs varying from a few microwatts to many kilowatts, involved the building of 115 million elements into very many units and the assembly of 76,500 rectifier sets, including 120,000 transformers and chokes. For making the last two items mentioned, 1,625 tons of electrical sheet steel was formed into laminations of various types within the Westinghouse works while the weight of copper wire of different gauges and coverings used for making coils exceeded 550 tons.

Meanwhile, early selenium rectifiers had suffered a severe reverse, but plant was laid down in 1939 for the production of the selenium compound "Westalite," having a better forward characteristic and stability of reverse, which have enabled it to displace the copper-oxide type for many power purposes because it is smaller, cheaper, more efficient and suitable for operation under oil.

Nevertheless, the copper-oxide type is still superior for most instrument work, being available for full-scale deflections of 250 μA and 1, 5, 10, 100, 500 mA; also for high-frequency circuits, for modulators and demodulators, while several millions are in use for polarizing relays and absorbing inductive discharges in line circuits in British, Colonial and foreign telephone and telegraph systems. Five sizes of copper-oxide element are now made and several processes are employed to impart different electrical characteristics.



Control gear, regulator and oil tank containing the transformer and condenser of a 150-mA, 45-kV rectifier for a precipitator

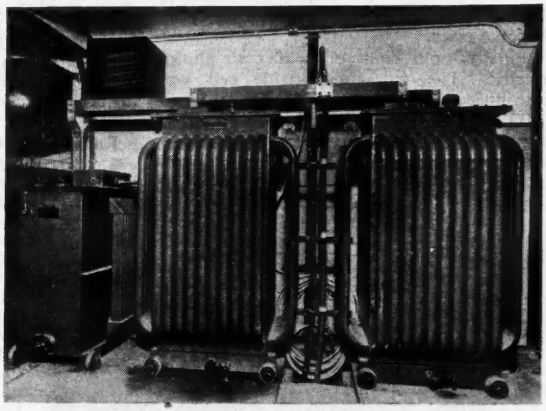
Seven sizes of selenium-compound element are made by three different processes on a quantity basis with machines mostly devised and built by the company itself. Oil-cooled double voltage elements became available in 1946 for such heavy duties as anodizing, electro-polishing and the electrolytic production of hydrogen gas. Up to 38 W per element is obtainable at 90 per cent efficiency; rectifiers for 1,000 kW output are being constructed. An additional advantage in this kind of service is that the polarity cannot possibly be reversed.

The smallest "Westalite" element made, in a sealed case, is used for charging a condenser which discharges through a neon tube

for the purpose of energizing a step-up transformer for cattle fences. Many thousands have been sent abroad for this purpose.

Last year entirely new equipment was introduced for cinema arc projectors, having its own phase convertor and providing a full-wave three-phase output from a single-phase input. The production commenced last year, too, of a type sealed in an unusual way between flat metal cooling plates to exclude water, oil and dust for lighting cycles, motor-cycles and cars in conjunction with an inductor alternator, which method avoids brush-gear and cut-out troubles associated with dynamo charging. A similar combination of lighter construction is being employed in aircraft to save weight and prevent interference caused by commutator sparking. In this case the rectifiers are cooled by air blast and weigh 1·5 lb per kW output, furnishing 210 A at 30 V.

High-voltage developments this year have made it possible to obtain 10 kV from a single unit only 8 in. long and $\frac{7}{16}$ in. in diameter. An outfit is made for d.c. pressure testing power cables and insulators up to 150 kV; other types provide up to 120 mA at 600 V for the anodes of radio receivers, while the most recent "Westeht" incorporating a multiplier circuit produces 5 kV for television cathode-ray tubes from the a.c. input 350-0-350 V winding of an ordinary transformer, so rendering unnecessary the high-voltage transformer and rectifying valve commonly used hitherto.

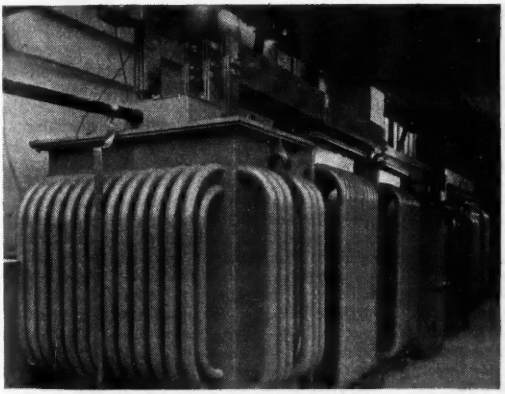


Rectifier delivering 1,000 A at 24 V for starting Rolls-Royce gas turbines on the test bed

The leakage current of the selenium "Westalite" is very small, but increases at a high power of the applied voltage beyond a certain reverse stress. Advantage is taken of this fact in the design of a.c. surge arrestors, elements being connected back-to-back. Three such assemblies connected in star will protect a two-wire line to earth and between the two lines.

Such a triple path arrestor will protect a 60-V single-phase line and other models will protect a.c. lines up to 470 V. The rectifier will recover immediately the surge is over; in the event of its destruction, a new assembly may be plugged in.

A further development of this principle is employed in the series-circuit lighting of runways at airports. Two elements and a fusible disc are built into the cap of each lamp. A surge causes a short circuit within the cap, so bridging the broken filament of

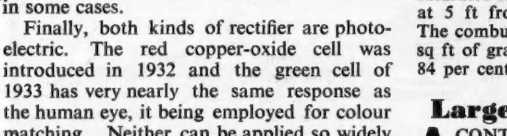


"Westalite" 4,500-A rectifier bank for sulphuric acid anodizing

any lamp which fails, thus restoring the series circuit.

Mobile "prams" are built for starting aircraft engines, the gas turbine type requiring 1,500 A to start and 750 A to spin the rotor in some cases.

Finally, both kinds of rectifier are photo-electric. The red copper-oxide cell was introduced in 1932 and the green cell of 1933 has very nearly the same response as the human eye, it being employed for colour matching. Neither can be applied so widely as the 1948 selenium "Photector," which is available in two sizes (40 by 22 and 35 by 19 mm) chiefly for incorporation in photographic exposure meters. These cells are not provided with any housing, but are built into the instrument.



Early copper oxide rectifier equipment for charging miners' lamp batteries

Burning Low-Grade Coal

BY subjecting coal with a high "fines" content to water and steam damping, full output of 80,000 lb per hr has been obtained from boilers at Burton-on-Trent power station which would previously maintain only 55,000 lb with high carbon in ash loss. *Fuel Efficiency News* for September contains a description of a device designed by Mr. G. C. P. Llewellyn to secure even distribution of the fuel. The cost of the conditioning equipment amounted to £35 per boiler. The coal was a free-burning bituminous slack of 10,750 B.th.u. per lb with 8 per cent of inherent moisture and 4 per cent of free moisture and containing 32 per cent volatile matter and 13 per cent of ash. In size, 55 per cent was below $\frac{1}{4}$ in., including 33 per cent below $\frac{1}{16}$ in.

After 500 hours running the superheaters were formerly completely fouled; now 3,000 hours is secured at normal rating and 1,500 hours at maximum continuous rating with near elimination of bird-nesting. Water was sprayed into the coal entering the distributing chutes (raising total moisture content to 20 per cent) and saturated steam (700 lb per hr at 30 lb per sq in.) at 5 ft from the bottom end of the chutes. The combustion rate at m.c.r. is now 40 lb per sq ft of grate per hr and the thermal efficiency 84 per cent based on gross calorific value.

Large Locomotive Order

A CONTRACT for forty electric locomotives, valued at £1¾ million, has been placed with the North British Locomotive Co., Glasgow, by the South African Railways. The locomotives, which will weigh 132 tons each, are designed for the haulage of passenger and freight traffic on the Durban - Volksrust and Cape Town-Beaufort routes.

All the electrical equipment, to the value of about £1,000,000, is being supplied by the General Electric Co., Ltd. These locomotives, which will be powered by six nose-suspended motors of approximately 500 h.p. each, are considered to be the largest yet built with provision both for multiple-unit control and regenerative braking on descending gradients. They will operate at 3,000 V d.c. The distance from Cape Town to Beaufort West is about 300 miles, in the course of which there are long gradients of 1 in 66, with a maximum of 1 in 50 in places. Haulage of passenger trains of 680 tons and goods trains up to 1,200 tons on this steeply-graded route is a requirement of the design, and the highest permitted speeds wil be from 55 to 60 m.p.h.

Nine running speeds will be available by series-parallel connection of the motors. The control equipment will be electro-pneumatic. Forced ventilation for the motors will be provided by blowers on the two motor-generator sets which will supply circuits for the contactor and auxiliary circuits at 110 V, and excitation for the traction motors during regeneration.

Two exhausters and a compressor will be included in the auxiliary machinery. A tender carrying a boiler for steam-heating passenger coaches will have its own pantograph for supplying the heaters, but power from the locomotive will be used for lighting, feed pumps, and control.

Overall length of the locomotives will be 66 ft 4 in., and the width 9 ft 6 in. The distance between bogie centres will be 32 ft 6 in., and each bogie will have a wheelbase of 14 ft 8 in. The adhesive weight of 114 tons will be divided equally between the six driving axles.

Oil Fuel Conference

GAS TURBINE COMBUSTION PROBLEMS

IN his presidential address to the liquid fuels conference, held jointly by the Institute of Petroleum and the Institute of Fuel, at Birmingham University (21st to 23rd September) Mr. John A. Oriel observed that the insufficiently considered switching over from coal to oil in the 1947 crisis was a type of waste of fuel which must be avoided in future.

One of the papers submitted to the conference was by Messrs. I. Lubbock and I. G. Bowen (Shell Petroleum Co., Ltd.), who briefly outlined some of the combustion problems associated with gas turbines. The paper first differentiated between the theoretical efficiencies of the primary cycle, without and with cooled compression, and those of the recuperative and double isotherm cycles.

It then turned to means of controlling the entry of air for stabilizing the flame so as to cause pressure drop across the combustion chamber, to allow time for the air and fuel droplets to become intimately mixed. What effect the design of the air director had on the pressure drop required for proper combustion was stated to be largely unknown. Data thereon could only be collected from the testing of different designs in service. The ratio of length to diameter was usually chosen to suit the cone angle of the fuel spray and the axial velocity of the gas in the primary combustion zone. The use of air-blast fuel atomizers usually lengthened the flame, so tending to make the turbine longer and reduce its diameter as, for example, the 2,000-h.p. Westinghouse machine.

Burning a Range of Fuels

The authors next described a proposed multiple-tip burner designed to suit a range of fuels. It was made up of an igniter with one pilot and three main burners, which differed in respect of output and spill orifice sizes. Each burner and the igniter could be removed independently, under pressure, while the gas turbine was running.

It had not yet been established that continuous running with heavy residual oil fuels could be attained with certainty. Atomization and flame configuration problems had by no means been fully explored, while the experience of one firm of turbine constructors had shown that fuels containing certain types of ash-forming constituents might be troublesome.

Two lines of investigation were being followed: first, it was hoped to correlate ash-forming propensities of various fuels by tests in a fixed type of combustion chamber and, secondly, the ash-catching tendencies of rotating turbine wheels might be modified by altering the blading.

Turning to the use of heat exchangers for improving cycle efficiency, the authors stressed their economic and practical aspects. The need for accurate costing of the heat exchanger was of vital importance, especially in present-day projects designed to use large diameter tubing.

The last section of the paper was concerned with specific applications, on a cost of fuel and maintenance basis. For instance the introduction of a highly efficient laminar flow regenerator or recuperator would, the authors believed, take the uncertainty out of present comparisons between diesel engines and gas turbines for railway locomotive work.

For moderate powers, the expected lower maintenance costs of gas turbines should influence ship owners to experiment with them, as they weighed less and occupied less space than diesel and steam engines.

Power Station Applications

For land power generation with 60,000-kW steam and 15,000-kW gas turbines, the latter could not compete with fuel oil costing 50 per cent more than coal on a calorific basis. For equal outputs of 15,000 kW without steam reheating, the gas turbine would show 10 per cent better fuel economy. The authors considered that there was a good opportunity for the gas turbine to establish itself for stand-by and peak load purposes.

The first cost of gas turbine plant should not exceed about 70 per cent of equivalent steam plant; it used one-quarter of the cooling water needed by steam plant and the handling of liquid fuel was much simpler. Since, however, the fuel bill still represented 65 per cent of the total cost per kWh sent out, a radical change in status could not occur unless the difference between the prices of oil and coal narrowed appreciably, or the thermal efficiency of the gas turbine was raised to about 37 per cent.

Finally the paper referred to the combination of steam and air plant on the Brown Boveri "Velox" principle and the bold experiment represented by the French "equipressure" project at the Arrighi power station. That 1,200-h.p. prototype was providing experience for the building of a 15,000-kW set to be installed in the Issy les Moulineaux power station. Compressors furnished air to the boiler, so that steam and combustion gases were maintained at the same pressure. Thus the one boiler provided steam for one turbine and compressed hot gases for another, both running on the same shaft. There were several ways of designing such an installation according to the type of compressor employed; little space was occupied since the steam generator could be placed close to the turbines, omitting the boiler house and much piping, and simplifying reheating.

Views on the News

By REFLECTOR

THE North of Scotland Hydro-Electric Board's proposal to run a power line at a cost of £689,000 from Keith in Banffshire to Aberdeen might seem at first glance an expensive way of supplementing the output of the Ferryhill steam station. Saving in coal, however, will probably justify the capital cost. Also, traffic may not be all one-way. Experience in Eire has illustrated the advantage of keeping in being and even extending the coal fired station in Dublin, whose useful days were once thought to be numbered. This station has done good work in easing the supply position when droughts have adversely affected the operation of the Shannon water-power station.

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In a recent conversation Mr. Girvan, electrical engineer and manager, Belfast,told me that their policy in Belfast, when called upon to connect to consumers' premises, is to make a nominal charge to the consumer for their inspection visit if the work done by the contractor does not come up to the required standard. They communicate to the consumer the reason for this charge and leave him to deal with the negligent contractor. Mr. Girvan is satisfied that this is a very effective method of discouraging bad work, especially by local contractors who could not afford to incur the risk of adverse publicity of this kind.

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In B.B.C. news bulletins last week reference was made to the order for forty electric locomotives for South Africa placed with the North British Locomotive Co. This company's name was plainly stated but the announcer said that the electrical equipment was being supplied by another British firm. As this part of the order represents about half the value I think the G.E.C. might have been mentioned without any suspicion of "plugging."

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Roast swan is not so common on the modern menu as it once was. There are probably not so many swans and I fancy that there is some sort of taboo upon their consumption by commoners. Be that as it may, there was a feast of roast swan at Thetford recently thanks to electricity. The bird in this case flew into some overhead lines and met its death. It is not reported whether it was recovered ready roasted or whether it needed further treatment.

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A correspondent who was present at the opening of the television demonstration at the British Exhibition in Copenhagen tells me of the difficulties which were met. A good many people who wanted to see the televised opening ceremony performed by King Frederick could not get into the exhibition. The lighting in the Town Hall was inadequate, but the outside shots were excellent. During the afternoon a gale brought down the transmitting aerial from the top of the Tivoli pagoda and then the temporary side wall of the improvised studio was blown out. Hasty repairs were successful, however, and the first evening demonstration was on time. The Danish artists did well in their first television performances and the demonstration was well received.

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Hitherto I have regarded with some suspicion suggestions of "co-operation" between electricity and gas, but a proposal of the Coventry Gas Committee, reported in last week's *Electrical Review*, seems to me free from undesirable implications. The plan is to install a gas turbine which would use waste heat from the gas works to generate electricity. The cost per kW quoted for the 600-kW unit is high, but the expected saving in coal should be much more than enough to meet capital and operating charges. The experience to be gained should, I consider, make the experiment well worth while.

◆ ◆ ◆

A rather unsporting method of catching trout is contemplated by the Bristol Waterworks Co. According to a report in the *Bristol Evening World:* "During the winter months a portable generator run by a motor will be used to pass an electric current across Blagdon reservoir. All trout swimming through that current will be temporarily stunned and will float to the surface where they can be easily netted." This unwaltonlike procedure is justified, however, by the consideration that the netted fish will be used for re-stocking or experimental purposes.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Wind Power

IN the article in your issue of 17th September, Mr. Hermann Honnef appears to claim that he has already constructed a 5,000-kW wind turbine. The illustration shows a well-known type of radio or transmission tower, in which the author's firm specialized, but which, with its relation of height to base would be ill adapted to take the enormous loads due to a 5,000- to 10,000-kW wind-driven generator.

The propeller shown on the tower appears to be a two-bladed contra-rotating propeller; it would require a greater wind velocity to generate 5,000 kW than a tower of that design could stand. Also it appears to bear no relation whatever to the wind-tunnel model.

The last two paragraphs on page 433 are confusing and incorrect, as they indicate that the rings joining the blades get their power of rotation from the exciting current rather than from the wind.

For an account of the progress of wind power in recent years I would refer to *Power Plant Engineering* of October, 1942, to the *Electrician* of 14th May, 1943, and to a report which has recently been issued by the Stationery Office which deals largely with Honnef's wind-power schemes and his calculations and includes a drawing of a tower with a five- and six-bladed contra-rotating propeller turbine with generator rings similar to the model.

Wallington, Surrey. A. H. SNEWIN.

Impregnating Plant

WITH reference to the subject of vacuum *versus* non-vacuum processes raised in your correspondence columns (13th and 27th August and 10th September), "L.E.S.'s" points in defence of non-vacuum methods are statements of fact applicable to wound components of many types and sizes—but "L.E.S." has not conceded this not unimportant qualification.

Where a manufacturer has established that a process involving dipping, without first evacuating the air, gives excellent results with certain windings, criticism of his use of this method for these windings can result from prejudice only. On the other hand many manufacturers, particularly those producing a wide range of wound components, have proved that with certain of their windings nothing like complete impregnation can be secured by simply dipping them, either cold or hot, in a varnish possessing excellent penetrating properties consistent with reasonably high solid content.

Hence vacuum impregnating plants are still employed widely, particularly as between the jobs which can be impregnated satisfactorily without vacuum, and those which definitely require the stimulus of vacuum, there exists a multiform range where the efficacy of a non-vacuum method is problematical. P.H.

Trafford Park.

Portable Electric Tools

I AM electrical engineer to a company which is a large user of electric tools and for years we have enjoyed a trade discount. We are now informed that we are not entitled to a trade discount. Apparently we have to go to some "back street" ironmonger and give him a large order to pass on to the electric tool people who will dispatch the tools direct to us while a "rake-off" of from 20 to 30 per cent is given to the ironmonger who renders no service and does not even employ any electrical staff.

I would like to appeal to other large users to see to it that we get fair play. After all the lamp makers give graded discounts to trade users. A factory with a maintenance staff and a fleet of cars and lorries gets a trade discount on automobile batteries. If your factory has a power station and uses lubricating oil you buy this at trade commercial rates.

Yeovil. W. J. BENNETT, A.M.I.E.E.

Electrical Accidents

IN existing circumstances it is not surprising to hear of regrettable and unnecessary electrical accidents, particularly in domestic circles. Anyone without electrical knowledge can, without hindrance, carry out "installation" work. Likewise any householder can carry out his or her own extensions and makeshift repairs.

Very few installations are thoroughly examined and tested before being connected to the supply and no system of periodical inspection is in existence for domestic

installations. A large proportion of installations are definitely unsatisfactory and a number positively disgraceful.

There is, of course, a remedy for this strange situation, but the odds appear to be against it.

Glasgow. ALEX. MILNE, SENIOR.

Ionospheric Radio Communication

THE fundamental principles of ionospheric radio communication are brought into understandable relation with the practical problems of radio communication in a recently published American book, which has been prepared by the National Bureau of Standards. It gives a clear and concise explanation of the physical and mathematical theory underlying electromagnetic wave propagation, with particular reference to radio-wave propagation, by reflection from the ionosphere. The nine chapters of this 209-page volume, which contains an extensive bibliography of references, is intended to give readers a basic understanding of the variations which occur in the ionosphere and a satisfactory solution of the problems that are encountered in radio communication.

The mathematical theory is presented first, the subsequent chapters dealing with measurement techniques; structure and variations of the ionosphere; maximum usable frequencies; practical problems of absorption; atmospheric, solar and cosmic noise; and lowest useful high frequencies. A number of problems are worked out in detail to assist the reader in applying the various methods to specific cases. The book is obtainable from the Superintendent of Docnments, U.S. Government Printing Office, Washington, 25, D.C., price $1.

Smoke Abatement

Annual Conference

ADDRESSING the annual conference at Cheltenham yesterday (Thursday) of the National Smoke Abatement Society, Sir George Elliston, the retiring president, said that the yearly loss of fuel carried by smoke was equivalent to about 2½ million tons and by invisible gases it was 10 million tons. In a report on the prevention of air pollution that might be due to the projected power station at Carrington it was stated that neither of the gas washing systems in use at Battersea (which required very large supplies of water) and at Fulham, each of which eliminated 95 per cent of the sulphur, would be suitable. Gas washing would not be prescribed unless shown necessary by twenty-eight instruments sited at points one mile apart under the guidance of the Department of Scientific and Industrial Research.

It was also reported that of fourteen district heating schemes approved three—at Coventry, Pimlico (1,690 houses) and Wythenshawe (7,585 houses)— would be thermal-electric and that the first 100 houses at Pimlico had been connected.

Mr. C. Gandy, of Manchester, chairman of the Executive Council, in the annual report stated that a deputation had met Lord Citrine and Mr. Hacking of the British Electricity Authority, to discuss the problems of atmospheric pollution from generating stations. Mr. Gandy said that the Authority was fully sympathetic and they were satisfied that the means being employed in the new stations to prevent the emission of grit could not, in our present stage of knowledge, be bettered. With respect to the removal of sulphur acid gases, the deputation was assured that the Authority was carrying out research in order to determine the most practicable means to prevent the emission of sulphur, without undue expense.

I.E.E. Benevolence

Income and Grants

THE report of the Court of Governors of the Incorporated Benevolent Fund of the Institution of Electrical Engineers shows that the invested capital has increased to £90,958. Income from dividends and interest was £1,242 and from subscriptions and donations £14,735 in the 7½ months reviewed. Contributors numbered 9,107, or 40 per cent of the total membership in a full year. Grants were made to 84 persons (also providing for the necessities of 66 dependants) of whom more than two-thirds were not contributors or their dependants. Grants totalled £3,569, an average of £43 per beneficiary in 7½ months. The Wilde Fund, bringing in £94 yearly, made grants totalling £52. The aggregate of the Homes Fund is £21,950 and the income from the Lord Hirst Fund is £376 yearly.

Auxiliary Generating Plant

Extended Use Requested

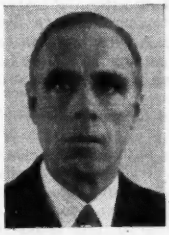
AN appeal to industrial and other undertakings owning auxiliary electrical generating plant to use it to relieve the public supply at least during the hours 8 a.m. to noon and 4 to 5.30 p.m. from the beginning of October to the end of March was made this week by the Ministry of Fuel and Power. It is pointed out that some of the plant was supplied on condition that it was kept in continuous use during working hours. To save oil the condition was waived during the summer. Owners of auxiliary plant are also asked to run the plant at other times if requested to do so by a Regional Board for Industry in connection with the electricity load-spreading arrangements.

I.E.E. Sub-Centres

CHAIRMEN FOR THE 1948-49 SESSION

THE new chairman of the *I.E.E. Rugby Sub-Centre* is **Mr. R. G. A. Dimmick**, A.M.I.MECH.E., who was instrumental in establishing it in 1945, becoming the first hon. secretary. He graduated at Leeds University and became a student apprentice with the British Thomson-Houston Co., Ltd., Rugby, in 1932. Later he joined the company's Industrial Motor and Control Gear Sales Department, and in the early part of the war he was transferred to the Research Laboratories where he took charge of the radar and magnetron model rooms. In 1945 he joined the company's Marine Department to take over diesel-electric ship propulsion work and electric torpedo production for the Admiralty. He was appointed manager of the Marine Engineering and Commercial Department in January, 1947. Keenly interested in the training of young electrical engineers, he was appointed to the B.T.H. Rugby Apprenticeship Committee earlier this year.

Mr. R. G. A. Dimmick



Mr. A. Gardner

Mr. J. E. Morley

Mr. W. W. Grimes

Mr. J. E. Morley (*South - Western Sub-Centre*) was educated at Chatham Technical School and H.M. Dockyard Upper School, obtaining the external degree of B.Sc.(Eng.), University of London, in 1939. He served as an engineer apprentice at H.M. Dockyard, Chatham, from 1923 to 1928, after which he entered the Post Office Engineering Department as probationary inspector, later being engaged on apparatus and cable inspection at contractors' works in various parts of the country. Mr. Morley was promoted assistant engineer in 1935, and spent four years at the Post Office Research Station, Dollis Hill. He was promoted to area engineer, Exeter Telephone Manager's Area, in 1942.

Mr. Alex. Gardner, B.SC., F.R.S.A. (*North-East Scotland Sub-Centre*) was educated at Burnley Grammar School and Manchester University, where he took an honours degree in engineering. He served an apprenticeship at Burnley Corporation electricity works, and had further experience at Ashton-under-Lyne and with the Lancashire Dynamo & Motor Co. Joining Aberdeen Corporation Electricity Department as assistant to the development engineer, he subsequently became substation superintendent, development engineer, and city electrical engineer in 1937 on the retirement of Mr. J. A. Bell. Mr. Gardner is now the Aberdeen area manager for the North of Scotland Hydro-Electric Board, and is one of the Board's representatives on the District Joint Board and Joint Industrial Councils for the North of Scotland Area, and also on the Scottish Committee of the Electrical Development Association.

Mr. W. W. Grimes, A.M.I.MECH.E., M.INST.F., A.M.I.I.A. (*Sheffield Sub-Centre*) served his apprenticeship with Hunter & English, Ltd. He joined the West Ham Corporation electricity undertaking in 1928 as technical assistant first at the power station and then, in 1935, in the Mains Department, and assistant district superintendent in the Mains Department in 1939. In 1941 he went to Chesterfield as consumers' engineer and meter superintendent and two years later became engineer and manager of the Chesterfield undertaking. When it was taken over by the East Midlands Electricity Board he was appointed manager of the Chesterfield District of the Derbyshire and Nottinghamshire Sub-Area, and senior executive officer of the Chesterfield generating station.

Mr. G. Rutter (*West Wales* (*Swansea*) *Sub-Centre*) is on the staff of the area electrical engineer (Area 1), South Western Division, National Coal Board. He received his technical education at the University College, Swansea. In 1929 he was appointed assistant electrical engineer to the Graigola Merthyr Co., with which he was apprenticed, and in 1936 took up the position of electrical engineer to the Glasbrook Co., Ltd., Gorseinon. Mr. Rutter is past chairman of the Swansea University College Engineering Society, and past president of the West Wales Branch of the Association of Mining Electrical and Mechanical Engineers.

B.E.A.M.A. Export Catalogue

AFTER special study and detailed planning in consultation with the British Electrical and Allied Manufacturers' Association, it is announced by Iliffe & Sons, Ltd., that they are undertaking for B.E.A.M.A. the publication, early in 1949, of the first complete catalogue and directory of the electrical and allied products manufactured by B.E.A.M.A. members.

This 1949/50 B.E.A.M.A. catalogue will form a comprehensive up-to-date buyers' guide for engineers and distributors all over the world. First print order will be for a minimum of 10,000 copies, posted direct to business houses, corporations, municipal authorities, chambers of commerce, etc., in every country, on lists compiled by a special B.E.A.M.A. committee. A high proportion of the catalogues will be for overseas, home distribution being severely restricted.

The catalogue is planned to contain approximately 700 pages, size 11¼ in. by 8¼ in., full bound in dark blue cloth with gold lettering. The first three of the six divisions will consist of illustrated descriptive catalogue pages in which members can feature their products in semi-editorial style and in up to three standard colours. The three remaining divisions comprise a classified buyers' guide with more than 1,000 product headings, a trade directory of manufacturers and a catalogue index. Dividers with plastic covered thumb index tabs separate the divisions. The catalogue divisions will be printed on art paper and the remainder on antique wove.

E.P.E.A. Dinner

THERE were nearly 400 present at the twenty-first (and first post-war) dinner given on 25th September by the Southern Division of the Electrical Power Engineers' Association to the National Executive Council. Mr. T. W. Lukehurst (chairman) announced that in future the Division would be known as the South-Eastern Division.

Lord Citrine (chairman, B.E.A.), proposing the toast of "The Association," referred to the need for organizations to be truly representative, as the principle of consultation between employers and employees was a recognized part of the organization of industry. Speaking as a former trade-union official he mentioned the tendency for those who did least for their association to be the most critical of its work. He drew attention to the similarity between the E.P.E.A. memorandum on the reorganization of the industry and the Act of 1947. The Association's criticisms of any present shortcomings would be welcomed, although it was always easier to enunciate principles than to apply them.

Mr. F. Lumby (president, E.P.E.A.), harking back to a remark by Lord Citrine on the large number of electrical bodies known by initials, said that wives of honorary officials interpreted those of the Association as "Every Possible Evening Away." He was glad that the previous practice of supply undertakings of allowing time off for the Association's business was to be continued by the B.E.A. and the Area Boards. Since vesting day membership had increased by about 50 per cent and was now over 10,000. He pledged co-operation with the B.E.A., which he regarded as a model to any nationalized industry.

The toast of "The Electricity Supply Industry" was briefly proposed by Mr. V. W. Dale (general manager, E.D.A.), who predicted a great commercial advance in 1953, when it was expected that generating plant capacity would make it feasible. Responding, Mr. H. Nimmo (chairman, Southern Electricity Board) traced the course of reorganization proposals from the McGowan Report of 1936, and said that under any Government, he considered that the position would be similar to that of to-day.

When called upon by the chairman, Mr. F. H. Smethurst (hon. sec. Southern Division) disclaimed, as usual, any especial credit for organizing a most successful evening, which wound up with a dance.

Institute of Welding

THE annual dinner of the Birmingham Branch of the Institute of Welding was held last week, about 250 attending, with Mr. R. G. Braithwaite, M.INST.C.E., chairman of the Branch, in the chair.

Mr. J. J. Gracie, M.I.E.E., general manager, G.E.C. Engineering Works, Witton, and past-chairman of the Birmingham Branch, proposing the toast of the City of Birmingham, said that the activities of the Institute extended into all branches of engineering. During the war years the Midlands provided one-third of the Empire's output of armaments, and to-day the area was producing one-third of the Empire's output of engineering products.

In his reply, the Lord Mayor (Alderman J. C. Burman) said that he was familiar with the part played by welding wherever products were made from metals, and he was glad to know that the Birmingham Branch of the Institute was amongst the most active.

Sir Donald Bailey proposed the toast to the Birmingham Branch, and in responding Dr. J. H. Paterson, president of the Institute, said that to-day metallurgists producing new metals to give specific qualities, must also ensure that the metals were of a composition making them readily weldable, otherwise they will lose about 65 per cent of their market value.

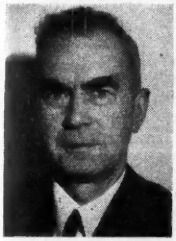
Mr. Braithwaite toasted kindred associations and visitors, and Major C. R. Dibben, O.B.E., secretary of the Nut, Bolt and Screw Association, replied.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE British Electricity Authority has transferred **Mr. J. D. Peattie,** B.SC. (LONDON), A.C.G.I., M.I.E.E., at present deputy chief engineer (transmission) to the position of deputy chief engineer (generation) in the place of the late Mr. R. R. Martindale. The post of deputy chief engineer (transmission) is to be taken by **Mr. D. P. Sayers,** B.SC., M.I.MECH.E., M.I.E.E., who is now chief engineer to the Midlands Electricity Board.

Mr. Peattie was with the Central Electricity Board for eighteen years and was deputy chief



Mr. J. D. Peattie

Mr. D. P. Sayers

engineer for over three years. Before that he had been with Siemens-Schuckertwerke, Berlin, the Metropolitan-Vickers Electrical Co., Ltd., Edmiston Brown & Co. and the Manchester Electricity Department. . .

Mr. Sayers was deputy chief engineer and manager of the Birmingham undertaking before joining the Midlands Board. His earlier experience had been gained with British Insulated Cables, Ltd., Twiss & Partners, Kennedy & Donkin and the Sheffield Electricity Department. . . He will take up his new duties on 1st November.

The British Electricity Authority, Eastern Division, announces that **Mr. H. B. Campbell,** A.M.I.MECH.E., M.INST.F., senior executive officer (divisional), Ipswich, has been appointed station engineer at Cliff Quay, and that Mr. **Mr. J. R. Rowbottom,** A.M.I.E.E., M.INST.F., boiler house superintendent at Ironbridge, has been appointed assistant station engineer at Cliff Quay.

Mr. A. G. Ellis, F.C.G.I., M.I.E.E., chief transformer engineer of the Metropolitan-Vickers Electrical Co., recently resigned the chairmanship of the B.E.A.M.A. Transformer Technical Committee which he had held since 1922. On 21st September past and present members of the Committee entertained Mr. Ellis to luncheon at the Waldorf Hotel, London, to express to him their appreciation of his services and to present him with an illuminated address and a radio receiver. At an earlier luncheon given by the associated transformer manufacturers, Mr. Ellis received a barometer and chiming clock. Mr. Ellis is, and has been, the chairman of the Advisory Committee on Transformers of the International Electrotechnical Commission since it was formed in 1937 and was recently appointed chairman of the main technical committee of the B.S.I. on transformers.

Mr. F. M. Bruce, M.SC., PH.D., A.M.I.E.E., has been appointed to the chair of electrical engineering in the Royal Technical College, Glasgow, in succession to Prof. S. Parker Smith, who retired recently. Dr. Bruce is head of the High-Voltage Laboratory Nelson Research Laboratories, English Electric Co., Ltd., at Stafford.

Lord Simon of Wythenshawe is the new president of the National Smoke Abatement Society. He has been associated with the smoke abatement movement for many years, and was hon. secretary of the Smoke Abatement League of Great Britain, one of the Society's parent bodies when it was founded in Manchester in 1909.

Lt. Col. Hexell A. Lewis, M.B.E., T.D., B.SC.(ENG.), M.I.E.E., has relinquished his appointment with the Engineering Division of the British Broadcasting Corporation to take charge of the Broadcasting Division of Marconi's Wireless Telegraph Co., Ltd.

Mr. I. H. Hedley has resigned his position with the Yorkshire Electric Transformer Co., Ltd., and is starting in business on his own account at " Winfield," Hill Crest Road, Savile Town, Dewsbury (telephone 1006).

The National Final for the **Electrical Industries National Golf Championship** is to be held at Moor Park on 8th October. There were eighteen entries in the London and Home Counties Area Final played recently at the R.A.C. Country Club, Woodcote Park, Epsom. Mr. H. Murfin was the winner (score 85-18 : 67) with Mr. R. E. Prickett (score 88-18 : 70) runner up. Mr. H. W. Hall had the best gross score (79). Sir Montague Hughman presented the prizes. The referee was Mr. J. A. Dixon.

Qualifiers for the National Final are Messrs. H. Murfin, R. E. Prickett, H. W. Hall, J. Holder, R. M. Smart, and E. J. Cripps. For new competitors there will be a benefit match in which the first prize will be a silver tankard. Inquiries regarding the event should be made to the hon. secretary, Mr. A. Hughes, Bical House, 21 Bloomsbury Street, London, W.C.1.

Mr. J. E. Nelson, who at the end of September retired from the position of chief executive officer of the Merseyside and North Wales Electricity Board, was presented last Friday with a silver tea service of the directors, staff and workmen, and a glass water set by the

Recreation Club. Mr. Nelson joined the Mersey Power Co., at its inception in 1911, and supervised the construction of the distributive system. Later he became engineer and manager, and a director of the company. Mr. Nelson was appointed to the Mid-Cheshire Electricity Co. board when the company acquired control from Imperial Chemical Industries, Ltd., and in 1944 became engineer and manager of the joint companies, a position he retained until the undertaking was nationalized.

Sir Robert Watson-Watt is to receive the Reginald Mitchell Memorial gold medal of the Stoke-on-Trent Association of Engineers on 4th October and will deliver the third memorial lecture, his subject being "Radar—the Complement of the Spitfire."

Mr. D. H. Parry was elected president of the Leicester Electrical Society at the annual meeting held on 16th September.

Mr. W. J. Lloyd, B.SC., A.M.I.E.E., has joined Philips Electrical, Ltd., as chief engineer of the Amplifier and Public Address Department. He resigned his position of chief engineer of Guy R. Fountain, Ltd., in March last. During the war Mr. Lloyd was in the British Broadcasting Corporation Recording Department. He is a graduate of University College, London, and served a three-years' student apprenticeship at the British Thomson-Houston Co., Ltd., Rugby.

Obituary

Mr. F. L. Ogden.—The death on 18th September is reported from Colwyn Bay of Mr. Fred L. Ogden, who retired from the position of borough electrical engineer in 1941. Mr. Ogden was educated at Manchester Grammar School and the Technical School (now the College of Technology) and after an electrical apprenticeship took a post with the Northwich Electric Supply Co. After a period in the Harrogate undertaking he went to Oldham in 1902 and in 1904 became chief assistant. In 1914, with Mr. W. (later Sir William) Chamberlain, mains superintendent, he was appointed joint engineer and manager. When Mr. Chamberlain became manager of the tramways in 1918, Mr. Ogden assumed full charge of the electricity undertaking. In 1935 he served as chairman of the North-Western Area of the British Electrical Development Association.

The late Mr. F. L. Ogden

WILLS.—Mr. O. Lucas, joint managing director of Joseph Lucas, Ltd., left £318,268 gross (£251,804 net).

Mr. D. F. Harrison, joint general manager of Mullard Electronic Products, Ltd., left £9,909 gross (£9,284 net).

Mr. Mark Whitgift, development officer with the London and Home Counties J.E.A., and for many years hon. secretary of the Batti-Wallahs' Society, left £1,889 gross (£1,778 net).

Mr. A. W. Hudson, director and works manager of Frederick Thomas & Co., Ltd., left £1,979 gross (£1,725 net).

Mr. J. H. Sandiford, M.I.E.E., London representative of Johnson & Phillips, Ltd., left £1,909 gross (net value nil).

Mr. J. R. W. Grainge, M.I.E.E. for many years chief assistant to the chief mechanical engineer, G.W.R., left £5,277 gross (£5,142 net).

Mr. G. E. Barrett, chief commercial officer, Eastern Electricity Board, left £11,279 gross (£10,651 net).

Mr. C. P. Sutthery, O.B.E., A.M.I.E.E., formerly manager of the Merchandise and Lamp Sales Department of the British Thomson-Houston Co., Ltd., left £17,217 gross (£16,902 net).

Mr. L. J. Hunt, late director and sales manager of the Electric Construction Co., Ltd., left £3,448 gross (£3,365 net).

The 1949 Convention

At Torquay in June

AT the final I.M.E.A. Convention held at Eastbourne in June it was decided that steps should be taken to continue this annual event in an appropriate form and a representative committee was set up to discuss the arrangements. At a meeting of the interested organizations last week Torquay was accepted as the venue of the first British Electrical Power Convention to be held from 13th to 17th June next year.

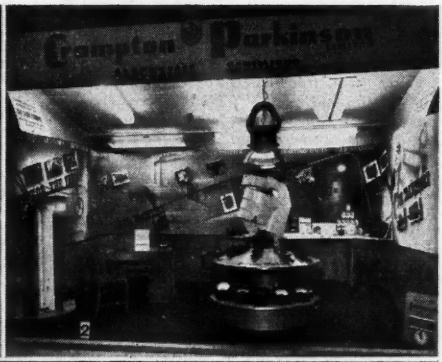
Lord Citrine has been elected president of the 1949 Convention and Mr. J. W. Simpson, O.B.E., has been appointed secretary. The Convention office is at 16, Stratford Place, London, W.1.

E.I.B.A. Ball

THE annual ball of the Electrical Industries Benevolent Association will be held on 12th November at Grosvenor House, London. Oscar Rabin and his band will provide the music and the cabaret includes the Botonds (Continental acrobats) and Ronald Boyer and Jeanne Ravel (international dancing stars). As in previous years the number of people that can be accommodated is limited and early application should be made for tickets to the secretary of the Association at 32, Old Burlington Street, London, W.1. The Association requests that no cheques be sent with applications. As soon as a ballot of tickets has been taken applicants will be advised of the number they have secured, and a cheque for the correct amount can then be forwarded.

Copenhagen Exhibition

SOME OF THE ELECTRICAL DISPLAYS



1.—View of the stand of the General Electric Co., Ltd. 2.—Crompton Parkinson, Ltd. 3.—Simplex Electric Co. (part of the Tube Investments display). 4.—Muirhead & Co., Ltd.; on the stand are Mr. Harold Wilson, President of the Board of Trade, with the Danish Minister of Commerce. 5.—Telegraph Construction & Maintenance Co., Ltd.; with the chairman, Sir Geoffrey Clarke, are Lady Clarke and Mr. W. F. Randall (director)

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Mr. Champion raised the question of safety on the railways. While he paid a tribute to the British Railways for their comparative freedom from accidents he suggested that automatic train control, track circuiting or signal locking should be adopted. There were also the possibilities in short-wave communication between trainmen and signalmen, and in improved signalling methods—for instance, greater penetration of light. He hoped that all these things would be considered by the Railway Executive.

Mr. Barnes, the Minister of Transport, said that there was no difference of opinion on the need to expand and extend automatic train control, but there were certain applications which required further experimentation, and a section of line had already been set aside by the Railway Executive for the purpose. The programme of extending automatic train control to all the main lines would represent an expenditure of from £6 to £8 millions, and, in relation to the capital invested in the railways, that was not an excessive sum. Regarding track-circuiting, that was already going on, and the programme so far sanctioned represented a further expenditure of £5 millions. But it was not the capital expenditure which presented the difficulty today. The limiting factor was shortage of equipment. He did not consider that one could look to radar and radio transmission for very substantial improvement.

Oil Firing at Bankside

Mr. Skeffington-Lodge asked the Minister of Fuel and Power whether he would publish the results of the investigation undertaken in connection with the pledge given that the Bankside power station project would not be proceeded with if the oil fuel burned there was found to emit fumes harmful to nearby buildings.

Mr. Gaitskell said he would inform the House of the results of the tests, but they would not be available until next spring.

Wavelength Changes

Mr. Collins asked the Postmaster-General what the changes would be in the wavelengths available to this country for either home or overseas programmes, as a result of the agreement signed on 15th September at the international conference on radio wavelengths.

Mr. Paling said that one long and thirteen medium wavelengths were allocated to this country in the plan signed at Copenhagen on 15th September. The 1933 plan allocated one long and ten medium wavelengths but the B.B.C. had been using temporarily three additional wavelengths belonging to other countries. The long wave—1,500 metres—was the same in both plans but the medium waves were all different. The Copenhagen plan would be introduced in March, 1950, and the wavelengths were sufficient to ensure that the B.B.C. programmes could be carried on substantially as they were at present.

Electricity Supply in Cyprus

The Secretary of State for the Colonies (Mr. Creech Jones), replying to Col. Ponsonby said that the first stage of an electricity grid scheme for Cyprus, comprising the installation of a power station and a part of the distribution system, had now been approved subject to the completion of financial arrangements which were still under consideration with the Cyprus Government. Orders for certain plant had already been placed, and the Cyprus Government intended shortly to appoint an electrical expert to take charge of the technical side of the scheme. Arrangements were also being made to appoint civil consulting engineers to prepare the design of the power station.

Coal and Electricity Prices

Sir Waldron Smithers asked the Minister of Fuel and Power if he would give the increases in the prices of coal, gas and electricity since the National Coal Board took over.

Mr. Gaitskell said he regretted that information was not available to provide a simple summary statement of the increases in prices. Information collected by the Ministry of Labour for the cost of living index showed the following increases in prices to domestic consumers between July, 1947, and July, 1948:—Coal, 13 per cent; gas, 8 per cent; electricity, 5 per cent.

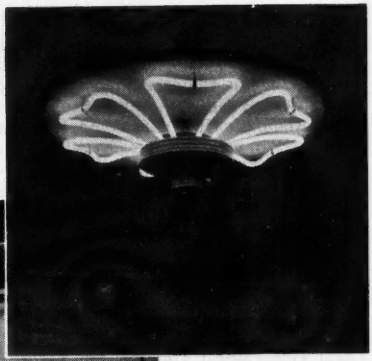
Free Enterprise

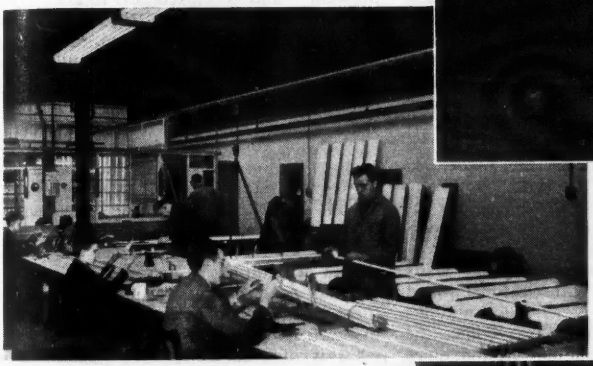
ALTHOUGH a political case has been built up against free enterprise during the past forty years, its positive achievements have seldom been given publicity. A book entitled "What About Enterprise," by John Gloag, which is published by Allen & Unwin, Ltd., at 10s. 6d., critically examines the case against free enterprise and exemplifies two remarkable and totally different enterprises. It will be of some interest to electrical engineers because the first of these is the Tennessee Valley Authority in America. In a chapter on comparative enterprise the hydro-electric scheme on the Saguenay River in Canada is described and although details of this project have been published in various Canadian technical journals, no comprehensive account has been given in this country. The book is full of unusual and little-known facts about the achievement of free enterprise on both sides of the Atlantic.

Cold Cathode Lighting

NEW FACTORY FOR THE MANUFACTURE OF EQUIPMENT

THE production of cold cathode fluorescent lighting equipment by Austin Walters & Son, Ltd., marks a new stage in the company's history of illumination development which dates back fifty years. Starting in 1898 as theatre lighting engineers, the company in 1932 commenced the manufacture of neon tubes and carried out a considerable amount of research work under the management of Mr. M. F. Bradberry. In anticipation of a large demand for the tubes after the war, an additional new factory was built in 1947 in Ayres Road, Old Trafford, Manchester, 16, on the same site. With the almost complete closing of the neon tube market as a result of the banning of advertising signs, attention was turned to the more generally applicable fluorescent lighting, particularly the high-voltage cold cathode type.

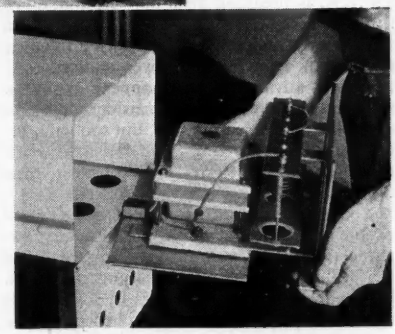




Above: A special decorative fitting for use in cinemas and hotels

Left: Cold cathode tube making department

Below: The transformer unit is readily removable from the fittings



As a result, the company can now supply a complete range of cold cathode tubes in almost any length, diameter, shape or colour. The loading is approximately 30 W per 4 ft 6 in. of tube with an operating voltage of 1,200-3,000 V. Special advantages over hot cathode tubes are instant starting, extremely long useful life and lower maintenance cost. A high efficiency is claimed to be maintained throughout their life, which is reckoned at 6,000 hours—though 10,000 hours is by no means uncommon.

In addition to a number of standard 4 ft 6 in., 5 ft 9 in. and 7 ft 6 in. fittings for use with these tubes, special decorative fittings are produced for use in cinemas and hotels, etc. A novel feature of the standard fitting is that the unit incorporating the transformer can be immediately removed from the end of the fitting at the same time automatically disconnecting the circuit. All the transformers used in the fittings are manufactured by the company, which also makes power transformers of up to 100 kVA, and this Department is under the management of Mr. Douglas Walters.

Educational

The City and Guilds of London Institute has issued its regulations and syllabuses for examinations in telecommunications and electrical subjects for the Session 1948-49. Copies can be obtained from the Department of Technology, 31, Brechin Place, South Kensington, London, S.W.7.

Power Station Staff Salaries

Senior Men's Dissatisfaction

By STATION SUPERINTENDENT

READERS of "Reflector's" notes in the *Electrical Review* will have noticed that a normally inarticulate body, the senior engineers in power stations are expressing anxiety with regard to their future welfare. It is considered opportune, therefore, to give some explanation of the circumstances of this disquiet.

It was obvious that under nationalization the last remnant of direct relations between employer and employees would disappear and that a self-contained Whitley Council system would emerge to regulate salaries and conditions throughout the staff side of the industry. It is now common knowledge that three bodies, the National Association of Local Government Officers, the Associated Municipal Electrical Engineers and the Electrical Power Engineers' Association were accepted by the British Electricity Authority as representing the staffs and, for our purpose, only the last-mentioned is under discussion.

In contrast to the other two bodies the E.P.E.A. is breaking little new ground, since for over a quarter of a century it has had a negotiated schedule which purported to cover every staff man in the power station. At first sight advantage might appear in such a situation, but when one considers the apt metaphor of a structure, old, but too valuable to discard, solidly ensconced but a little off the site suitable to its new purpose, then difficulties emerge.

Readers of this journal have been informed of the enormous progress our industry has made during the past twenty-five years, and they will appreciate the increasing demand it has made on operating staffs as regards qualifications and experience in both technical and administrative spheres. In contrast the staff salary schedule has reflected little of these changed conditions; it was only in the case of the more enlightened power companies that a true appreciation of requirements was evidenced in adequate salaries.

In consequence of employers' obstruction the necessary overhaul of the National Joint Board Schedule has never previously been possible and only now is it in progress. The senior engineer has, by virtue of his minority position in a democratic association, suffered more in the process than the numerous middle staffs. Concessions, hard-won it is agreed, have been whittled down to nothing when applied to him, with the result that to-day the station superintendent's salary is only 35 per cent above that of the charge engineer, compared with 60 per cent a quarter of a century ago. Most of this "compression" has occurred in recent years, despite the fact that the national taxation system is purposely designed to achieve this same result; no wonder resentment is felt when the employer assumes the right to duplicate the process.

Another defect of the N.J.B. Schedule is its lack of appreciation of overall responsibility resting on the shoulders of the station superintendent. Obviously where ascending responsibility finally comes to rest the increment of salary should accordingly be increased.

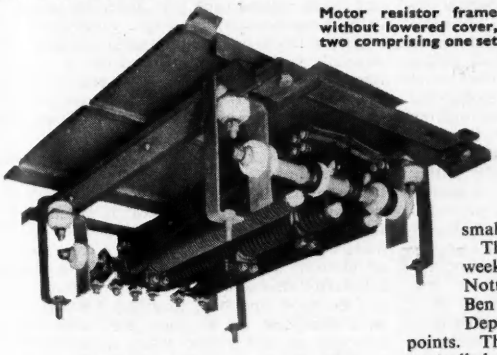
Senior engineers are apprehensive that these disabilities will receive no more attention in the future than they did in the past, but what is of even more consequence is the B.E.A.'s disregard for the before-mentioned more equitable salary standards established by the power companies. These undertakings operated some of the largest stations in the country, but their staffs were often not E.P.E.A. members; thus the inadequacy of the N.J.B. Schedule never received the criticism it deserved. The circumstances of this state of affairs are not relevant to the matter at issue; the outcome is that the N.J.B. Schedule was accepted as a yardstick for the industry as a whole, whereas in respect of the important section mentioned it can certainly justify no claim to be the appropriate instrument. Moreover, there is every indication that the B.E.A. organization is shaping more on the lines of that developed by the companies, rather than that usual with municipalities; on this count alone the company rates should have consideration.

We have been assured that staffs in the industry will not suffer loss as a result of nationalization, and no doubt in this connection the letter of the law will be observed, but ex-company officers whose promotion proceeds apace on a static salary will find scant comfort in this assurance.

Trolley-Bus Control

DEMONSTRATION OF B.T.H. EQUIPMENT AT NOTTINGHAM

CONTACTOR control of trolley-buses by means of a master foot pedal was introduced in 1922 by the British Thomson-Houston Co., Ltd., which developed the now widely used "scissors" type of master controller in 1931, since when various automatic methods have been devised.



Motor resistor frame without lowered cover, two comprising one set

Auto-acceleration is a refinement hitherto not always considered necessary, but it can offer certain advantages without restricting the driver's ability to notch up the speed of the vehicle step by step if required. It relieves him of strain by allowing him to press the foot pedal right down when starting and is of particular value when making a quick "get-away" in congested traffic, since "limited maximum" acceleration occurs without risk of "blowing" circuit-breakers. It thus prevents carelessly rapid rates of acceleration, which are detrimental to equipment and cause discomfort to passengers.

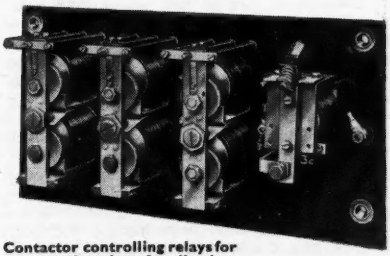
The B.T.H. scheme is all-electric, chosen because it is easier for maintenance depot staffs to extend their established methods to additional interlock type contactors than to learn new ways of servicing mechanical, hydraulic and similar mechanism.

The scheme operates partly under time and partly under current control. The accelerating period, in the case of the standard non-regenerative compound wound motor, can be regarded as split into three distinct parts. First, a number of entry points at which high external resistance, or field weakening, or a combination of both, ensure that the tractive effort necessary for the ultimate rate of acceleration required is built up step by step to ensure a smooth start; secondly, an accelerating period with full field during which the external resistance is progressively cut out of circuit; thirdly, a number of field weakening points over which the current must rise if the accelerating tractive effort is to be kept constant.

When driving a vehicle controlled in this way it is desirable to pass over the first stage points quickly in order to build up the rate of acceleration without loss of time; to pass over the second period points more slowly and carefully in order to keep the rate of acceleration constant; then the field weakening points can be passed over quite quickly, since the time constant of a modern motor field is of itself sufficient to prevent rapid changes of current and hence avoid excessive tractive effort peaks. Therefore only points in the second period require to be current controlled, the remainder merely needing a small amount of time delay.

The equipment demonstrated last week on a Sunbeam trolley-bus at Nottingham (in co-operation with Mr. Ben England, manager, City Transport Dept.) has nine intermediate notching points. The fourth, fifth and sixth are current controlled by three volt-drop relays, one for each point, connected across sections of the external starting resistance so that the voltage on the relays is a measure of the main current.

The early (first and second) points and the field weakening points (seventh, eighth and ninth) are given a small time delay by sequence interlocking; which means that one contactor, on closing, makes through its interlock the



Contactor controlling relays for auto-acceleration of trolley-bus

circuit for the next point. Thus about one-fifth second delay occurs between those points which are sequence interlocked.

The remaining third point is treated in a different way. When accelerating a lightly loaded vehicle the third point should be taken at a current between the entry and fourth point values. A fourth volt-drop relay set to that current would not operate, for the accelerating current of a heavily laden vehicle starting on

a severe gradient would not fall low enough.

To prevent the bus sticking under those conditions the third point is controlled by a special time relay designed to impose a delay of 0·75 second. That is sufficient to allow the motor current of a lightly loaded bus to drop to the desired value, while a heavily loaded vehicle will notch forward to the fourth point irrespective of the value to which the current falls at the third point.

All four relays are mounted together on a small panel fitted in the driver's cab on the Nottingham demonstration vehicle, which has been in trial service for two years. The Corporation has ordered six more control equipments of this kind; the conversion of trolley buses in South Africa is being discussed; and representatives of prospective trolley-bus builders in Finland are now in England studying this control scheme.

Other relatively recent trolley-bus improvements include driving motors of higher rating and floodproof design, with resistors of greater overload capacity and more effectively protected against the weather. Trolley-buses have already been fitted with a duct, which extends to the front of the vehicle, being very suitable for enclosing the RP-type resistor. The latter is a corrosion resistant aluminium-chromium alloy strip, continuously wound edgewise for rigidity, with welded terminals and ceramic insulating supports. It is described as 40 per cent lighter than cast grids and 65 per cent lighter than other kinds of strip resistor for similar duty.

An alternative enclosure is a more conventional box, earthed to the vehicle frame, having a canopied top and louvred bottom to admit cooling air, but to obstruct the entry of road slush that might bridge the insulating supports inside. This box enclosure is fitted underneath the Nottingham trolley-bus which, incidentally, is lighted by " Mazda " fluorescent lamps.

The 30-W tubes are 36 in. long by 1 in. diameter; each pair is operated in series with one choke serving each pair, but each tube has its own canister starting switch. Since the input is derived from the d.c. traction line, which may normally vary between 450 and 600 V, ballast lamps have to be provided. They are usually of the 40-W, 110-V traction type and are usefully employed to illuminate the front, rear and side indicators of the bus.

The fittings are moulded " Perspex " with metal end-caps. The cast aluminium main frame forms the inner face of a cavity over each side window. The control gear is mounted on the back plate, which also acts as a reflector and must be an insulator because of d.c. operation at relatively high voltage. For the same reason a polarity change-over switch is necessary. It can be hand operated, reversing the lamps at each switching, or arranged for actuation at intervals of five hours during lamp burning periods.

Consultative Councils

Appointment of Chairmen

LAST week the Minister of Fuel and Power announced that he had appointed chairmen-designate for the fourteen Electricity Consultative Councils to be set up under Section 7 of the Electricity Act, 1947. They will be *ex officio* part-time members of the corresponding Area Electricity Boards. The names of the new chairmen are given below:—

London.—Alderman I. J. Hayward (Leader of the London County Council).*

South Eastern.—Councillor M. A. Bulloch, A.C.G.I., A.M.I.E.E. (former chairman, Wimbledon Electricity Committee).

Southern.—Maj. Sir Hubert Young, K.C.M.G., D.S.O. (Bradford and Melksham R.D.C.).

South Western.—Alderman H. J. Perry, J.P. (Lord Mayor of Plymouth).

Eastern.—Alderman W. J. Bennett, J.P. (deputy-chairman, Essex C.C. and former chairman, Tilbury electricity undertaking).*

East Midlands.—Mr. L. L. Perkins (vice-chairman, Holland County Branch, N.F.U.).*

Midlands.—Alderman H. Leason, J.P., M.I.E.E. (former Lord Mayor of Stoke-on-Trent and chairman of North-West Midlands J.E.A.).

South Wales.—Alderman A. E. Gough, J.P. (former Lord Mayor, Cardiff, and chairman, Cardiff Electricity Committee).

Merseyside and North Wales.—Councillor Aled O. Roberts, J.P. (formerly Liberal M.P., and deputy-chairman, Liverpool Electric Power and Lighting Committee).*

Yorkshire.—Alderman W. Leach (member, Barnsley Corporation, former chairman of the Local Committee of the T.G.W.U.).

North Eastern.—Mr. W. S. Hall (National Union of Mineworkers).

North Western.—Alderman Wright Robinson, (former Lord Mayor, Manchester, National Union of Distributive and Allied Workers).

South-East Scotland.—Bailie J. M. Airlie (chairman, Edinburgh Public Utilities Committee).*

South-West Scotland.—Bailie A. B. Mackay (Glasgow City Council).

*Already part-time member of the Area Board.

Rural Development in Eire.—A further fifteen rural areas in eleven counties have been approved for electrical development, in addition to the twenty-one listed in the 1947-48 annual report of the Electricity Supply Board.

Next Week's Events

Monday, 4th October

BIRMINGHAM.—Imperial Hotel, 6 p.m. I.E.E. South Midland Supply and Utilization Group. "The Lightning Protection of High-Voltage Transmission and Distribution Systems," by H. M. Lacey.

CARDIFF.—At the South Wales Institute of Engineers, Park Place, 5 p.m. I.E.E. Western Supply Group. Chairman's address by T. R. Kernick.

LIVERPOOL. — Royal Institution, Colquitt Street, 6.30 p.m. I.E.E. Mersey and North Wales Centre. Chairman's address by T. B. D. Terroni.

LONDON.—At the Institution of Electrical Engineers, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers. Chairman's address—"Staff Management," by W. S. Procter.

Tuesday, 5th October

BIRMINGHAM.—Chamber of Commerce, New Street, 7 p.m. Television Society (Midlands Centre). "Description and Demonstration of some Applications of Valves and Cathode Ray Tubes in Television," by C. A. Norman and A. F. Hayes.

GLASGOW.—Electrical Society of Glasgow. "Rheostats," by D. H. Surgeoner.

LEEDS.—Yorkshire Electricity Board offices, 1, Whitehall Road, 6.30 p.m. I.E.E. North Midland Centre. Chairman's address by R. P. Horlock.

LOUGHBOROUGH.—The College, 6.30 p.m. I.E.E. East Midland Centre. Chairman's address by B. L. Metcalf.

MANCHESTER. — Engineers' Club, Albert Square, 6.30 p.m. I.E.E. North-Western Centre. Chairman's address by S. R. Mellonie.

Wednesday, 6th October

BIRMINGHAM.—James Watt Institute, Great Charles Street, 7 p.m. Junior Institution of Engineers (Midland Section). Annual general meeting.

MIDDLESBROUGH.—Cleveland Scientific and Technical Institute, 6.30 p.m. I.E.E. Tees-Side Sub-Centre. Chairman's address by T. A. Jackson.

SOUTHAMPTON.—University College, 6.30 p.m. I.E.E. Southern Centre. Chairman's address by B. W. S. Challans.

Thursday, 7th October

CARDIFF.—At the South Wales Institute of Engineers, Park Place, 5.45 p.m. Illuminating Engineering Society (Cardiff Centre). "General and Specialized Hospital Lighting," by M. W. Peirce and D. J. Reed.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. Presidential address by T. G. N. Haldane.

Friday, 8th October

CARDIFF.—Royal Hotel, 6.30 p.m. for 7 p.m. Illuminating Engineering Society (Cardiff Centre). Dinner and dance.

BIRMINGHAM.—Imperial Hotel, Temple Street, 6 p.m. Illuminating Engineering Society (Birmingham Centre). Chairman's address by Dr. J. H. Nelson.

EXETER.—I.E.E. South-Western Sub-Centre, 3 p.m. Chairman's address by J. E. Morley.

WAKEFIELD.—Technical College, 3 p.m. Association of Mining Electrical and Mechanical Engineers (Yorkshire North-West Branch). "Improvements in the Control of Coal Face Equipment," by J. Hopley.

LONDON.—39, Victoria Street, S.W.1, 6.30 p.m. Junior Institution of Engineers. "Industrial Relationship," by Cdr. Kyrle W. Willans.

At the Lighting Service Bureau, 2, Savoy Hill, W.C.2, 6 p.m. Royal Statistical Society (Industrial Applications Section). "Quality Control Charts in Cost and Productivity Analysis," by G. F. Todd.

Conditions in Iran

ECONOMIC and commercial conditions in Iran are surveyed in a report by Mr. N. S. Roberts, O.B.E., Counsellor (Commercial) to the British Embassy in Tehran (H.M. Stationery Office, 1s.). In the course of this, Mr. Roberts says that there are electricity supplies in the towns but they are rarely found in country districts. Even in the towns supplies are inadequate; existing plant is old and in need of repair or replacement but in any event the plant is insufficient. Plant in local factories is used to augment the supplies but the result is still unsatisfactory.

There is a big demand for generating plant, particularly diesel-driven sets. Mr. Roberts states that agents for British manufacturers receive many orders which cannot be fulfilled in under three years and there is a danger that the market will be lost to Czechoslovak producers who are making better offers.

The annual consumption of electricity per head in Iran is only 6·3 kWh—probably the lowest in the world. The supply is usually 220 V, 50 c/s, three-phase, although a few towns have 110-V supplies.

During 1947 the United Kingdom exported to Iran electrical goods and apparatus to the value of £956,951 (against £706,290 in 1946) and machinery (including electrical) valued at £2,332,215 (against £2,218,177). Import quotas have been arranged for the year to 20th March, 1949. They include "electric motors and machinery, electric apparatus and appliances" to the value of £2,184,000. The report gives details of the exchange arrangements applying to importers. Among the industrial machinery for which exchange purchase permits are given are electric generators of all kinds; electric pumps; drilling machines and other deep-well equipment; "electric mills"; and ice plants.

COMMERCE and INDUSTRY

South Africa's Plant Requirements. Important Overseas Contracts.

IN a recent interview, reported in *South Africa*, Dr. van der Bijl of the South African Electricity Supply Commission said that the Commission would require £20 million worth of electrical equipment in the next five years for the erection of the equivalent of eight or nine big power stations.

The installed capacity of the present power stations was 1,300,000 kW. In five years' time it would be 2,000,000 kW. The capacity of the stations at Colenso and Vaal would be doubled and new stations were planned for Pinetown, East London, Port Elizabeth, Worcester, Salt River, and Vierfontein, with possibly another at Witbank. The cost of the whole scheme would be £35,000,000 to £40,000,000 and virtually all the imported equipment (£20,000,000 worth) would come from Britain, as usual.

Engineering Wages

Meetings of the trade unions concerned were held last week to consider the recommendation of a court of inquiry that wages in the engineering industry should be raised by 5s. a week (the unions' claim was for 13s.). It was decided to accept the recommendation which has also been approved in principle by the Engineering Employers' Federation. The Federation has agreed to the initiation of discussions relating to a new wage structure for the industry.

Midlands Television

The television transmitter which the B.B.C. is constructing at Sutton Coldfield, near Birmingham, will operate at frequencies of 61·75 Mc/s (4·86 metres) for vision and 58·25 Mc/s (5·15 metres) for sound with powers of 35 and 12 kW respectively. The sound channel will be amplitude modulated and the upper sideband of the vision channel is to be partially suppressed to conserve wavelength space. Receivers to be used in the Midlands area must therefore be suitable for this form of asymmetric sideband transmission. Both signals will be radiated by a single aerial on a steel mast 750 ft high.

Lighting Lectures

At the Albert Hall, Leeds, on 22nd September, Mr. V. J. Francis, B.SC., A.M.I.E.E. (E.L.M.A. Research Laboratories) gave a lecture to an audience of 650. He dealt with luminous efficiency and the progress made by the various research teams of the member companies of the Electric Lamp Manufacturers' Association. Reference was also made to the question of colour and colour rendering.

The Lighting Service Bureau is arranging a three-day conference on electric lighting in industry (12th-14th October) at the Bradford Electricity Showrooms and a course of seven lectures (8th October-1st December) at the Mappin Hall, Sheffield (in co-operation with the Sheffield University Department of Extra-mural Studies).

Large Argentine Contract

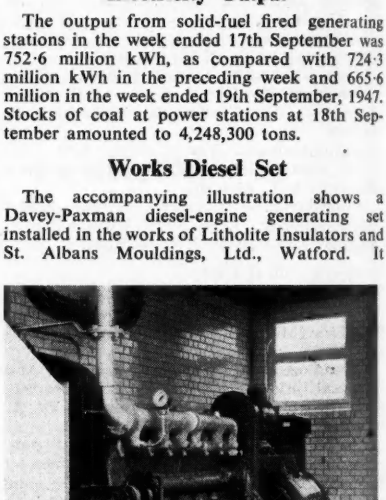
The General Electric Co., Ltd., has received a contract valued at about £270,000 for the whole of the electrical equipment for the Argentine Government's 150,000-ton grain storage and shipping elevator, which is to be built in the port of Buenos Aires and will be the largest in the Southern hemisphere. Electric motors are to be supplied, as well as transformers, main switchgear, lighting equipment and telephones, and it is anticipated that the new elevator will be in service within the next three years. The complete electrical equipment for four similar elevators built in Argentina during the war was also supplied by the G.E.C.

Electricity Output

The output from solid-fuel fired generating stations in the week ended 17th September was 752·6 million kWh, as compared with 724·3 million kWh in the preceding week and 665·6 million in the week ended 19th September, 1947. Stocks of coal at power stations at 18th September amounted to 4,248,300 tons.

Works Diesel Set

The accompanying illustration shows a Davey-Paxman diesel-engine generating set installed in the works of Litholite Insulators and St. Albans Mouldings, Ltd., Watford. It



100-kVA set at the Litholite works, Watford

consists of a Paxman "6RW" six-cylinder engine direct coupled to a 100-kVA four-wire three-phase 440/250-V 50-cycle Brush alternator. The set is started by a 24-V starter motor which engages a toothed ring on the engine flywheel and is operated by a press-button switch. The lubrication is initially primed by a hand pump and a pressure system then entirely eliminates hand oiling. Cooling is arranged by means of ducting to the exterior of the building from the engine radiator.

Telephone Cable Plumbing

An instructional film on telephone cable plumbing was shown in London last week; it was produced by the Central Office of Information at the request of the G.P.O., which intends to use it for training purposes. The film runs for some 25 minutes, showing the various stages of the operation in detail. It illustrates the "pot and ladle" and "lamp and stick" methods of plumbing a joint and ends with a section on pressure testing.

Government Cable Specifications

The Committee on the Standardization of Electrical Cables and Wires for Government Services has issued a revised version of G.E.D.S.10—Flexible Electric Cords. The chief amendments concern the inclusion of G.D.E.S.16 and 25 for insulant and sheathing rubber respectively. Copies can be obtained from the Stationery Office, price 3d.

Midlands Ideal Home Exhibition

Fifteen exhibitors of electrical and allied equipment are among those showing at the Midlands Ideal Home Exhibition which was opened by the Lord Mayor of Birmingham on Wednesday last at the Bingley Hall, Birmingham. The exhibition, which is to run until 23rd October, includes sections for radio and music, food and cookery and labour-saving devices, and there is a "Palace of Television" as one of the main attractions.

Swiss Goods for Bizone

Under the trade agreement concluded in August between Switzerland the Anglo-U.S. zone of Germany the Bizone is to receive from Switzerland machinery of all types to a value of $8,010,000, including $3,000,000 worth of turbines, generators, electric motors and transformers; steam boilers ($300,000); and $250,000 worth of electrical machinery and apparatus.—*Reuter* (Frankfurt).

Visit to Research Laboratories

In connection with the recent International Applied Mechanics' Congress a visit was arranged to the G.E.C. Research Laboratories, Wembley. Here the visitors were shown the physical eye photometer and colorimeter developed in the laboratories, fluorescent lamps, diamond wire-drawing dies, powder metallurgical products, cold pressure welding, a radio relay link for the transmission of television, transmitting valves, heat indication of turbine rotor forgings, and a demonstration of pressure distribution round an aerofoil in cascade.

Cromptonian Association

The hon. secretary of the Cromptonian Association, Mr. H. H. Spencer, Astor House, Aldwych, London, W.C.2, tells us that he would like to be notified immediately of changes of address, etc., of members during the past year.

Lamp Publicity

Attractive display pieces are being issued by Siemens Electric Lamps & Supplies, Ltd., to advertise their lamps and batteries, together with colourful showcards which will enhance the "pulling power" of window displays. In addition, lamps are being advertised in trade journals and the national press. Battery advertisements will appear chiefly in the radio trade journals and in provincial newspapers.

One of the new Siemens lamp showcards

Henley Telephone Cable for India

The Government of India has placed an order with W.T. Henley's Telegraph Works Co., Ltd., for lengths of dry-core telephone cable totalling over 220 miles. The approximate value of the order is £320,000. Henley's recently undertook a contract for the supply of similar cable to the Turkish Department of Posts and Telegraph. The value of this contract was also in excess of £300,000.

Surrey Contractors' Dinner

About 140 members and guests attended a dinner-dance held at Dorking by the Surrey Branch of the Electrical Contractors' Association on 22nd September. Mr. R. E. Bristow took the chair and among those present were Mr. J. G. Briggs, president of the E.C.A., and Mr. L. C. Penwill, director and secretary. Responding to the toast of the guests, Mr. Penwill urged full co-operation between the component parts of the electrical industry. He said that whoever might now be the owner of the country's 600 electricity undertakings, the electrical contractor remained the same person with the same responsibilities to the public. Guided presumably by political considerations, the Government had instituted

inquiries into the margins enjoyed by various sections of the electrical industry, methods of distribution and the efficiency and economy with which the industry rendered its service to the public. Therefore, electrical contractors must close their ranks and present to the Government a united front and ensure by co-operation that they could withstand any political attack or any attack on the grounds of economy. They must also combine to eradicate the inefficient so-called "electrical contractors."

A dance and cabaret followed the dinner. A silver plated sandwich dish was presented to Mr. and Mrs. S. W. C. Patching as a silver wedding gift.

Manchester Scientific Societies

We have received from the hon. secretary of the Manchester Federation of Scientific Societies, Dr. E. H. Rodd, I.C.I., Ltd., Dyestuffs Division, Hexagon House, Blackley, Manchester, 9, the calendar of meetings of the constituent associations for the period September, 1948, to January, 1949. It includes a list of the societies with the names and addresses of their secretaries.

Midland Electrical Engineers' Ball

The annual dinner and ball of the Midland Electrical Engineers' Association will be held on 19th November at the Grand Hotel, Birmingham. Tickets (30s. each) can be obtained from Mr. H. Hooper, British Electricity Authority, 53, Wake Green Road, Moseley, Birmingham, 13, or Mr. W. J. Bird, General Electric Co., Ltd., 125, Moor Street, Birmingham, 4.

Electrical Commercial Travellers

The Midlands Branch of the Electrical Trades Commercial Travellers' Association is holding a dinner and concert at the Market Hotel, Birmingham, next Tuesday, 5th October. The guests will include representatives of the Midlands Electricity Board and leading industrialists, wholesalers and contractors in the Midlands.

Socialization and Accountants

The president of the Society of Incorporated Accountants, Sir Frederick Alban, C.B.E., who is also a recently-appointed member of the Electricity Arbitration Tribunal was invited to address the American Institute of Accountants in Chicago on 22nd September. His subject was "Socialization in Great Britain and its Effect on the Accountancy Profession."

In his paper Sir Frederick Alban stressed the modern division of the profession into two branches—professional auditing and (as salaried employees) industrial accounting. He briefly reviewed the nature and extent of nationalization in this country and expressed the view that in the short run socialization would take away much auditing work previously carried out by professional accountants in public practice when particular industries were administered in relatively small units. Taking the longer view, he considered that the establishment of vast industrial enterprises under public ownership would call increasingly for the services of accountants in their day-to-day administration. It followed that the professional accountancy bodies in Great Britain must devote more and more attention to industrial accounting, as distinct from professional auditing.

Telecommunications Standards

The new edition of BS.530 has been considerably extended. It deals with graphical symbols for telecommunications in genefal; with telephony, telegraphy and radio communication in some detail; and, for the first time, with carrier communication and co-axial cables. Guiding principles for the use of these symbols in the preparation of diagrams are included. Copies are obtainable at 10s. 6d. post free from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Canadian Electrical Exports

Exports of electrical apparatus from Canada during the first half of 1948 were valued at $9,172,000 compared with $10,049,000 during the first six months of 1947 and $2,191,000 during the same period of 1938. Imports from January to June, 1948 were $34,625,000 against $34,225,000 in 1947 and $6,607,000 in 1938. The latest figures of electrical manufacture in the Dominion refer to the year 1946 when the total value was $243,444,000 compared with $230,532,000 in 1945 and approximately $90,000,000 before the war.

Electrical Housecraft Examinations

At the twentieth E.A.W. certificate examination in electrical housecraft for teachers, held in June, 51 candidates qualified. The total number of certificate holders is now 1,353.

The twenty-third examination for demonstrators and saleswomen was also held in June, when 114 candidates qualified for the certificate. The total is now 1,360.

Refrigerator Factory for Orissa

A factory for the mass production of refrigerators is to be set up in Orissa, under the sponsorship of the Government of Orissa.

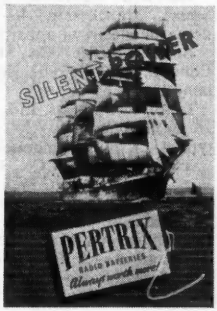
Exhibit of French Apparatus

A superheterodyne frequency meter and examples of aircraft communications equipment were displayed in London last week by Laboratoires Radioelectriques of Paris, the exhibition being arranged by Cossor Radar, Ltd. A number of interesting claims have been made with respect to the frequency meter which employs an unusual principle and is remarkable for its accuracy, speed, compact form and direct-reading facility. It is believed to offer unique advantages in comparison with other systems of frequency measurement. Air-

craft equipment was also shown covering the frequency ranges of 116-126 Mc/s with ten working channels. In addition there was a light tourist h.f. transmitter-receiver and radio compass which offers both communication and homing facilities.

Radio Battery Publicity

A new display-piece designed for "Better Listening Fortnight" is the "Exide" and "Drydex" coloured showcard of a nightingale in song. The showcard, which has the brand names in imitation neon tubing carries the message "For brilliance and clarity of tone," and is eyeletted for hanging and strutted for standing on floor or counter. Other display material available includes a small five-colour "Exide" and "Drydex" name showcard for hanging or standing, name plaques in gold on a variety of leather grain covers, and shelf strips.



New "Pertrix" battery showcard

A new Pertrix "Silent Power" showcard with unusual appeal will also be available for the "Better Listening Fortnight." It shows a photograph of a four-masted barque overprinted with the phrase "Silent Power." The yellow panel on a red and yellow striped background at the botton carries the message, "Pertrix Radio Batteries—Always worth more." The showcard is printed on aluminium backed with cardboard and can be hung or stood on counter or shelf.

Power Generation Statistics

It should have been stated that the figures in the table in our last issue (p. 474) showing kWh generated and sent out were *millions* of kWh. The figures for the North of Scotland were given in the second line of the table; the first line dealt with the B.E.A. system only.

Representation in Mexico

The British Embassy in Mexico City is anxious to have at its disposal as complete a record as possible of the agency arrangements in Mexico of United Kingdom exporters to enable it to answer inquiries from local firms desiring to obtain British goods. United Kingdom manufacturers and exporters who are not sure that their agency arrangements are known to the Embassy are asked to send brief particulars of them to the First Secretary (Commercial), British Embassy, San Juan de Letran 21-711, Mexico, D.F. The particulars required are the names of the principals, a brief description of the product or products covered, the name and address of the agent, the territory which he covers and the form of arrangement.

South Africa and Television

Although the South African Broadcasting Corporation is keeping in close touch with the B.B.C. and other organizations actively engaged in television, it is improbable that South Africa will have television before 1953, according to Mr. W. Hilarius, chief engineer of the S.A.B.C. in Johannesburg.

Equipment to receive programmes from either system could only be converted for use with the other at great expense, so that close study is essential before either the American or British methods could be adopted. It was hoped that, within five or seven years, a move could be made to standardize television. Small countries could then adopt it more freely.—*Reuter's Trade Services* (Johannesburg).

Trade Announcements

Neon Rentals, Ltd., 168, Victoria Street, London, S.W.1, has announced a scheme for the renting and maintenance of fluorescent lighting fittings.

Mr. R. A. Glasson, who was for twelve years with the Metal Box Co., is reorganizing the whole of the sales department of the newly amalgamated **General Accessories Co., Ltd.**, and **British Mechanical Productions, Ltd.** The complete range of electrical accessories is to be marketed under the single trade-name "Clix." The General Accessories Co. will be the distributing organization. Area representatives have been appointed to each of the territories covered by the fourteen Electricity Boards. These representatives are controlled by two sales supervisors, Messrs. J. D. Harris (North of England, Scotland and Northern Ireland) and A. M. Everett (Wales and Southern England). Mr. A. P. Tapping, who was radar adviser to Lord Reith at the Admiralty during the latter part of the war, has been appointed sales promotion manager, and Miss S. F. Keal, previously with the Southern Electricity Board, home economics supervisor.

The London Electrical Co. (Blackfriars) Ltd., has opened a new depot at 2-3, Swan Yard, Gravesend, where comprehensive stocks are available.

House-Service Units

Consumers' house-service control units, primarily for use in small dwellings, is the subject of B.S. 1454, the object of which is to ensure compactness of design and flexibility of installation. It specifies single-component and composite assemblies of main switch and fuse-gear needed for internal distribution from an earthed neutral single-phase system not exceeding 250 V at 50 c/s for 60A maximum load.

A type consisting of three single-component units and a composite assembly in one case are fully described in appendices. This specification can be purchased for 3s. post free from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Large-Scale Wind Power

Reference has been made in the *Electrical Review* to the E.R.A. Committee which was set up early this year under the chairmanship of Mr. T. G. N. Haldane (the new President of the I.E.E.) to investigate the technical and economic aspects of large-scale wind power. Preliminary studies have been sufficiently encouraging to warrant proceeding now to the experimental stage. Those who have information or considered views on the subject are invited to write to Mr. E. W. Golding, British Electrical & Allied Industries Research Association, 15, Savoy Street, London, W.C.2.

Electricity Supply Handbook

The second edition of its " Electricity Supply Handbook " has now been issued by the *Electrical Times*, Sardinia House, Sardinia Street, London, W.C.2 (price 2s. 6d.). The handbook has been considerably enlarged and additional features include the names of superintendents of power stations over 50 MW, and the addresses of district offices.

Drawing Office Organization

A report on " Drawing Office Organization " has been prepared by O. W. Roskill & Co. (Reports), Ltd., 14, Great College Street, London, S.W.1 (price 30s.). It deals mainly with engineering draughtsmen but attention is also paid to architectural draughtsmen. The first section covers such matters as the importance of ensuring that the design staff shall be kept up to date with technical information, the preparation of material lists, clerical work, and jigs and fixtures. Following this are sections on organization charts, office layout, equipment, methods and technique, recruitment and training, and trade unions or professional associations. Appendices contain organization charts, a list of suppliers of drawing office equipment and a bibliography.

Moulded Insulation

A series of specifications concerned with the performance of moulded materials for electrical insulation is approaching completion. The first, BS.488, is a revision and covers general purpose materials, excluding ceramics, for up to 250 V at working temperatures not exceeding 100 deg C. The whole series specifies substances from the point of view of designers who desire a free choice of materials having definite properties to satisfy particular conditions. Four grades of material are provided for, test methods being similar to permit comparison. Copies of the specification are obtainable from the British Standards Institution, 24, Victoria Street, London, S.W.1, price 2s. 6d. post free.

Trade Publications

The Telegraph Condenser Co., Ltd. (Radio Division) North Acton, London, W.3.—Reissue of technical bulletin No. 6 on capacitors for television equipment.

Alley & MacLellan, Ltd., Polmadie, Glasgow, S.2. — Folder illustrating air compressors, vacuum pumps and associated accessories.

Londex, Ltd., Anerley Works, 207, Anerley Road, London, S.E.20.—Leaflet describing a liquid or gas pressure operated switch.

Northern Industries, Snow Hill, Bradshaw Street, Manchester, 4.—Trade price list of domestic electrical apparatus and accessories.

Solar Electric Co., Ltd., Ballards Lane, London, N.12.—Folder dealing with automobile lamps.

Dawe Instruments, Ltd., 130, Uxbridge Road, Hanwell, London, W.7.—Leaflet describing the type 412A pulse generator.

The Mond Nickel Co., Ltd., Grosvenor Place, Park Lane, London, W.1.—Technical brochure on the " Nimonic " series of alloys and their application to gas turbine design.

Knightshades, Ltd., Derby Road Works, Montagu Road, Edmonton, London, N.18.—Priced leaflet on the " Enfield " fluorescent lighting fitting.

Trade Marks

APPLICATION has been made for the registration of the following trade marks. Objections may be entered within one month from 22nd September:—

LATIL (designs). Nos. 660,669, 660,670 and 660,673. Class 7. Electric generating plant and motors and engines (other than those for land vehicles) and component parts included in Class 7; and agricultural implements.—Latil Industrial Vehicles, Ltd., 7, Fitzroy Square, London, W.1.

ABAS. No. 651,661. Class 9. Wireless and electrical instruments and apparatus, and parts included in Class 9.—Marconi's Wireless Telegraph Co., Ltd., Electra House, Victoria Embankment, London, W.C.2.

BG (design). No. B652,605. Class 9. Electric bells, bell transformers, buzzers, switches, pear-pushes, bell pushes, and plug and socket connectors.—British General Manufacturing Co. (1941), Ltd., 38, Glasshill Street, London, S.E.1.

GUARANTEX. No. 663,369. Class 9. Electric vacuum cleaning apparatus.—John Barker & Co., Ltd. (trading as Pontings), 123, High Street, Kensington, London, W.8.

HOTRATOR. No. 663,134. Class 11. Apparatus for heating, cooking and steam generating.—Hotpoint Electric Appliance Co., Ltd., Crown House, Aldwych, London, W.C.2.

Overseas Electrical Trade

LOWEST EXPORTS SINCE FEBRUARY

OWING principally to the summer holidays British electrical exports during August were the lowest since February. Though £1,588,692 below July's record figure, the total was, however, £1,785,986 higher than the figure for the corresponding month of last year and no less than £6,156,012 above the monthly average for 1938. A particularly interesting feature of the month's returns is the continued rise in the overseas purchases of telegraph, telephone and signalling equipment, which reached a new record figure of

Table I.—Electrical Exports and Imports

Class	Exports			Imports		
	August, 1948 £	August, 1947 £	Monthly Av., 1938 £	August, 1948 £	August, 1947 £	Monthly Av., 1938 £
Telegraph and telephone wires and cables, (submarine)	411	34,149	17,289			
Ditto, not submarine	706,411	313,515	71,803			
Wires and cables, rubber insulated	364,680	480,212	117,533			
Ditto, cotton, silk or artificial silk insulated	59,465	62,054	†	14,963	6,559	31,246
Ditto, enamel, glass or asbestos insulated	29,409	21,671	†			
Ditto, paper insulated	605,120	285,004	103,457			
Ditto, other	112,528	111,587	49,799			
Commercial radio apparatus	167,718	104,535	28,296	45,675	18,269	58,018
Domestic radio apparatus	247,054	380,015	36,755			
Telegraph, telephone and signalling apparatus	1,145,680	510,327	242,716	4,421	8,708	9,243
Other radio, etc., apparatus	281,307	183,327	57,848	—	—	—
Radio valves	129,423	102,486	41,272	10,788	56,127	10,893
Electric carbons, furnace	*	*	*	29,078	7,897	4,054
Ditto, other	*	*	*	7,491	4,146	2,301
Electric lamps, not exceeding 24 V	21,120	15,305	49,440	7,039	2,351	10,265
Discharge lamps	22,757	21,447				
Other lamps	72,123	69,231				
Other lighting apparatus	388,899	270,891	48,565	3,259	24,702	38,662
Primary batteries	48,699	36,166	13,572	*	*	*
Accumulators for motor vehicles	109,115	188,983	16,418	*	*	*
Ditto, traction	16,868					
Ditto, radio	3,770	29,105	12,456	*	*	*
Other portable accumulators	16,184					
All other accumulators	33,652	26,325	19,773	*	*	*
Parts and accessories	61,633	32,780	—	*	*	*
Cooking apparatus and elements	132,801	96,033	16,600	*	*	*
Heating apparatus and elements	52,464	91,614	14,064	*	*	*
Other parts and accessories	28,786	23,950	—	*	*	*
Commercial electrical instruments	79,424	83,575	15,878	12,838	12,647	32,057
House service meters	207,158	108,936	15,791			
Other electrical instruments	94,952	65,950	9,612	*	*	*
Electro-medical apparatus (not X-ray)	24,427	20,433	3,038	*	*	*
X-ray apparatus, tubes and parts	39,683	38,892	4,881	25,207	46,654	9,734
Insulating cloth and tape	44,605	33,958	7,038	*	*	*
Other insulating materials	85,506	67,791	12,305	*	*	*
Unclassified goods and apparatus	431,299	326,184	108,085	29,106	31,075	56,529
Generators, up to 200 kW	223,100	118,523	38,071	*	*	*
Ditto, over 200 kW	98,102	137,958	119,079	*	*	*
Ditto, parts	98,184	107,248	—	*	*	*
Motors, railway and tramway	8,821	720	15,977			
Ditto, other, up to ½ h.p.	94,122	38,959	9,001			
Ditto, from ½ to 1 h.p.	47,096	33,551	2,470	28,724	15,818	26,033
Ditto, from 1 to 250 h.p.	338,855	248,934	96,637			
Ditto, over 250 h.p.	22,274	16,177	20,960			
Ditto, parts	57,847	57,562	—			
Converting machinery	3,681	31,778	101,304			
Transformers, including coils	340,298	315,915				
Rectifiers for power house use	20,247	16,027	3,463			
Motor starting and controlling gear	124,366	116,658	50,866	13,802	83,301	14,455
Switchgear and switchboards (not telegraph or telephone)	475,621	465,846	184,533			
Other electrical machinery	20,351	20,845	15,497			
Vacuum cleaners and parts	100,026	198,931	26,662			
Other electrically - operated portable appliances	47,088	37,161	10,394	3,971	13,828	24,627
Total	7,985,210	6,199,224	1,829,198	236,362	332,082	328,117

* Not classified separately. † Not separately distinguished in 1938.

£1,145,680—just over twice as much as in August, 1947, and nearly five times as much as the monthly average for 1938. This is the third successive month in which the total in this section has been over £1,000,000: South Africa was the largest buyer (£229,671),

Table II.—Distribution of Exports of Electrical Goods and Apparatus

Destination	August, 1948	August, 1947	Monthly Av., 1938
Eire	222,473	153,068	37,726
Channel Islands	56,043	39,212	12,177
Malta and Gozo	24,748	8,675	5,873
Cyprus	16,138	6,583	1,373
Palestine	23,875	69,732	8,426
British West Africa	65,966	42,252	12,889
Union of South Africa	784,818	609,119	162,584
Southern Rhodesia	66,334	57,373	9,632
British East Africa	64,298	54,119	7,893
India, Pakistan, etc.	488,127	569,208	123,789
British Malaya	176,874	171,283	32,792
Ceylon	69,188	47,418	15,048
Hong Kong	102,245	49,896	12,939
Australia	702,791	230,526	197,366
New Zealand	295,027	277,984	96,225
Canada	75,471	29,112	12,547
British West Indies	83,566	38,051	12,954
Anglo-Egyptian Sudan	24,711	30,407	2,989
Other British Countries	135,572	58,432	11,030
Soviet Union	1,953	2,739	36,781
Finland	35,282	27,125	5,969
Sweden	206,293	113,175	14,948
Norway	121,441	131,464	12,881
Iceland	21,672	8,430	2,796
Denmark	81,825	41,189	18,907
Poland	39,407	15,021	9,702
Netherlands	119,524	80,757	22,010
Belgium	142,207	101,176	11,208
France	73,483	55,496	16,082
Switzerland	33,099	26,374	3,768
Portugal	148,391	77,370	6,512
Spain	41,585	16,909	3,813
Czechoslovakia	46,505	20,898	7,205
Yugoslavia	1,670	22,428	1,475
Greece	35,040	17,546	4,926
Turkey	54,993	10,370	7,684
Dutch East Indies	25,415	12,849	2,692
Dutch West Indies	30,626	2,722	830
Portuguese East Africa	6,760	14,136	6,942
Lebanon	28,174	3,832	—
Egypt	187,634	122,561	13,176
Iraq	117,019	110,404	5,530
Iran	114,974	96,255	16,345
Burma	30,313	52,113	5,337
China	43,040	66,818	4,116
United States of America	19,140	15,982	5,839
Mexico	10,091	11,780	1,466
Colombia	7,426	11,989	845
Venezuela	77,786	40,690	2,936
Chile	8,707	12,912	6,635
Brazil	46,145	60,219	11,164
Uruguay	6,258	23,963	1,790
Argentine Republic	185,572	176,601	45,452
Other Foreign Countries	237,416	89,688	40,270
Total	5,865,131	4,236,431	1,134,284

Australia and New Zealand between them taking slightly more.

House service meters provided another bright spot. At £207,158 exports were the highest since January and compare with the pre-war figure of £15,791. There appears to be a further slackening in the demand for commercial radio apparatus, shipments at £167,718 being the lowest this year. Domestic radio apparatus exports at £247,054, £169,498 less than in August, 1947, also seem to indicate that saturation point in the markets now open is being reached. The biggest purchases were by South Africa (£33,311), Egypt (£32,365) and India, Pakistan, etc. (£29,562).

Of the £5,865,131 worth of electrical goods and apparatus (excluding electrical machinery) disposed of, Empire countries continued to account for a large proportion. The largest non-Empire buyers were again Sweden (£206,293), with Egypt (£187,634) and Argentina (£185,572) close behind. Portugal (£148,391) and Belgium (£142,207) also sustained their purchases.

The high level of electric motor exports reached in July (£791,123) was not maintained, falling to £569,015. Although this figure is just under the monthly average for this year, it is £173,112 more than that for August, 1947, and £423,970 more than the 1938 monthly average. India, Pakistan, etc., accounted for £106,838 worth of the shipments. Of generators to the value of £419,386 Australia bought £83,464 worth.

Imports of electrical equipment during the month amounted to £236,362, the lowest figure of the year and £95,720 below the 1938 monthly average. Of the electrical goods and apparatus imported, to the value of £189,865, the United States was responsible for £53,608 worth and Canada for £39,405.

Power Plant Contracts

DURING the past month contracts have been placed by the British Electricity Authority for generation and transmission equipment amounting in the aggregate to £2,919,490. The principal contracts include: Structural steelwork, Battersea station (Sir Wm. Arrol & Co., Ltd.); circulating water ducts, Agecroft (Fred. Mitchell & Sons, Ltd.); superstructure, Agecroft (J. Gerrard & Sons); l.p. piping, Agecroft (Stewarts & Lloyds, Ltd.); new circulating water system, Deptford (A. Waddington & Son, Ltd.); piling, Carrington (Taylor Woodrow Construction, Ltd.); dust collecting plant and valves, Fulham (James Howden & Co. (Land), Ltd.); coal-handling plant, Littlebrook "C" (Robert Dempster & Sons, Ltd.); circulating water culverts, screen chamber, inlets and discharges, Rye House (J. L. Kier & Co., Ltd.); Foundations, Clarence Dock (Liverpool) (Wm. Moss & Sons, Ltd.); 132-kV lines, Ipswich-Sundon (British Insulated Callender's Cables, Ltd.); 30-MVA 132/33-kV transformers, Dunfermline substation (English Electric Co., Ltd.); and 2,500-MVA 132-kV switchgear (Metropolitan-Vickers Electrical Co., Ltd.).

Reports and Dividends

General Electric Co., Ltd.—The report for the year ended 31st March last shows a consolidated profit for the company and its subsidiaries of £5,220,108 to which is added investment income of £255,945—a total of £5,476,053. After the deduction of depreciation, directors' remuneration, taxation, etc., the net profit attributable to the holding company is £1,758,010. With the addition of £1,677,088 brought in and other credits the amount available is £5,535,592. Allocations include £87,450 to general reserve, £858,050 to stock depreciation reserve and £1,230,010 to reserve for increased cost of plant replacement (less £1,198,631 surplus on reinstatement of assets). The ordinary dividend is maintained at 10 per cent, with a bonus of 7½ per cent, and £1,969,210 is carried forward. The company's net profit is £1,478,863 and with the amount brought in, etc., the sum available is £2,477,136. The allocations include £780,000 against future stock depreciation and £31,439 net to plant replacement reserve. A balance of £1,076,254 is carried forward.

The report shows a considerable increase in turnover and an excess of exports over the "target" figure. Much additional finance has been required and this has been provided by the company's bankers. The amount due to them has been reduced by the compulsory sale of the Electric Development & Securities Trust (under the 1947 Electricity Act) but further finance will be needed.

The Jerusalem Electric & Public Service Corporation, Ltd.—The directors announce that in view of the disturbed state of Jerusalem, the consequent falling off in the Corporation's income during the last six months, and having regard to heavy capital commitments which have been entered into for plant extensions, the payment of the dividend on the 7 per cent cumulative preference shares for the half-year ended 30th September, 1948, must be deferred. The directors are satisfied that the profits should not be less than those for 1947, in spite of big increases in wages and fuel charges. Since 1st April last, due to conditions in Palestine, no detailed monthly reports have been received, although the power station continues to generate on a very reduced scale. Some damage has been caused to the distribution system, but certain repairs have been effected and supplies are afforded through emergency overhead lines.

The East African Power & Lighting Co., Ltd., reports a net revenue for 1947, before tax, of £199,903, as compared with £195,738 for 1946. After providing for taxation and depreciation, placing £40,000 to reserves, and preliminary development expenses written off, it is proposed to pay an ordinary dividend of 7 per cent (same), and to carry forward £71,588 (against £69,072 brought in). The company's licences and properties in Uganda were handed over to the Uganda authorities on 31st May last, the amount of compensation agreed being £364,112. Since the close of the financial year 800,000 4 per cent preference shares of 20s. each were offered for public subscription at 20s. 6d. A further programme of extensions has recently been approved and additional finance will be required in due course to meet proposed capital expenditure. At the annual meeting in Nairobi on 14th October, resolutions will be submitted increasing the authorized capital from £2,500,000 to £4,500,000 by the creation of 2,000,000 additional shares of 20s. each either as ordinary or as preference shares, so that the company may be in a position to make appropriate issues of capital as and when required.

The Nigerian Electricity Supply Corporation, Ltd., held its annual meeting on 21st September, Major E. Seaborn Marks (chairman and managing director) presiding. In his review of the past year's working, which was circulated with the report and accounts, the chairman said that they agreed to supply power to an additional tin mining company, and other concerns were contemplating converting their methods of working to electricity. Costs of operating their power stations had increased by 300 per cent in the past ten years, and to meet the rising costs they were making a small increase in the charge for power supplied. With a total of 14,000 kW installed, the maximum demand was 12,000 kW, which did not give a sufficient standby of generating plant or allow of a further supply. They had therefore decided to harness a third fall in the Kurra River.

Richard Crittall & Co., Ltd.—At a meeting of creditors on Monday last Mr. H. V. Cozens, the new chairman, said that by the end of the week the subsidiary companies, with certain exceptions, would have been liquidated. The company owed a total of £1,316,000 against which there were assets valued at £879,000. Orders in hand were valued at £1,700,000. If the creditors would refrain from applying for a compulsory winding-up order the new board would put a reconstruction scheme before them by which "quite an amount would be saved from the wreckage." The creditors agreed unanimously that there should be one month's moratorium.

Thorn Electrical Industries, Ltd., held its annual meeting on 24th September, when Mr. Jules Thorn (chairman and managing director), who presided, said that during the past year considerable progress had been made in the incandescent and fluorescent field, and the

new factory at Merthyr Tydfil would soon be in full production. Referring to the fluorescent lighting business of the company, the chairman said that their capital expenditure on new equipment, research and development had been considerable. Their co-operation with Sylvania had only recently started, and it would take time before the full benefit of this tie-up became effective. Their radio division had had an excellent year, but the prospects for this year were less promising. They had achieved a further increase in the volume of their export trade, and their products had been sold to seventy countries abroad.

Newton Bros. (Derby), Ltd.—Speaking at the annual meeting held on 23rd September, Mr. P. C. Cooper-Parry (chairman), who presided, said that during the year under review 12 per cent of the sales was for export, and of the orders now on hand, export orders amounted to 20 per cent of the whole. Production for the five months ended 31st August last was slightly better than for the corresponding period of 1947, and the order book was being well maintained and covered a wide range of both customers and products.

Sydney S. Bird & Sons, Ltd.—The directors state that although there was a small profit for the six months to 30th June last, they do not feel justified in paying an interim dividend. Last year there was an interim dividend of 15 per cent, followed by a final payment of 15 per cent.

Simms Motor Units, Ltd.—The directors have deferred the payment of the half-yearly dividend on the 7½ per cent cumulative preference shares until the results for 1948 are known. They say that this should not be taken as an indication of any deterioration in the company's position, which is being well maintained.

Lancashire Electric Light & Power Co.—The directors have declared the last dividend on the ordinary stock (at the rate of 7½ per cent per annum) for the three months ended 31st March last.

The Telegraph Condenser Co., Ltd., has announced an interim dividend of 5 per cent (same).

Ericsson Telephones, Ltd., has declared an interim dividend of 5 per cent, tax free (unchanged).

Increase of Capital

Hackbridge & Hewittic Electric Co., Ltd.—Capital increased by £50,000, in 200,000 5s. ordinary shares, beyond the registered capital of £750,000.

New Companies

Regional Relays (Scotland), Ltd.—Registered in Edinburgh 11th September. Capital, £10,000. To operate radio relay systems. A. McLeod, 460, Perth Road, Dundee, is the first director.

A. C. Dibley & Co., Ltd.—Registered 16th September. Capital, £2,000. Electrical engineers, electricians, electrical and wiring contractors, etc. Directors: A. C. Dibley, C. W. Sanford and Dorothie A. Sanford. Regd. office: 8, Salisbury Court, Fleet Street, E.C.4.

Sims & Arnold, Ltd.—Registered 18th September. Capital, £5,000. Dealers in electrical and mechanical plant, fittings and equipment, electrical engineers, etc. The subscribers are: B. C. Lazarus and A. Duchin, both of 5, Queen Anne Street, W.1. Solicitors: Aukin Courts & Co., 5, Queen Anne Street, W.1.

S. R. Mapplebeck, Ltd.—Registered 3rd September. Capital, £1,500. Electrical, radio and television engineers, experts and consultants, etc. Directors: S. R. Mapplebeck (permanent managing director), J. C. Cooper and A. Lythe. Regd. office: 116-118, Camp Road, Leeds, 7.

Elsmore & Rees Radio, Ltd.—Registered 7th September. Capital, £1,000. Manufacturers of, and dealers in, wireless and television sets, etc. Directors: G. E. R. Elsmore and Elsie Elsmore and H. P. Rees. Regd. office: 3, Swansea Road, Pontardawe, Glam.

Electriks (Newcastle-on-Tyne), Ltd.—Registered 9th September. Capital, £1,500. To acquire the business of an electrical and radio dealer and contractor carried on by T. Hedley at Doric House, St. Nicholas Street, Newcastle-on-Tyne. Directors: T. Hedley and J. H. Burns. Regd. office: Doric House, St. Nicholas Street, Newcastle-on-Tyne.

Leslie Lloyd, Ltd.—Registered 13th September. Capital, £500. Electrical engineers, electrical installation contractors, etc. The permanent directors are:—S. L. Lloyd and Lorna D. Lloyd, both of 40, Hillcrest Road, Crosby, Liverpool, 23. Secretary: Lorna D. Lloyd. Regd. office: 37, Bridge Road, Blundellsands, Liverpool, 23.

M. & H. Electrical, Ltd.—Registered 6th September. Capital, £500. Manufacturers of, dealers in, and repairers and hirers of, electrical and mechanical apparatus, particularly radio sets and valves, etc. Subscribers: P. R. Daish and Hilda B. Winchcombe. Regd. office: 46, Market Place, Reading.

Company Struck Off the Register

The name of the Southern Electric Free Wiring Co., Ltd., has been struck off the Register and the company is thereby dissolved.

Companies to be Struck Off Register

The names of the following companies will be struck off the Register at the expiration of three months from the dates stated unless cause is shown to the contrary:—10th September: Bustler Electric Co. (London), Ltd.; Hydrelex Electrical Utilities, Ltd.; Marylebone Electric, Ltd. 14th September: Cable Drums, Ltd.; Neon Tubes, Ltd.; Vitalec Electrical Products, Ltd.

STOCKS and SHARES

WITH the international clouds deepening almost day by day, Stock Exchange business, as might be expected, runs at a low ebb. The outstanding feature of the past week, and, indeed, of September as a whole, was the strength shown by the market for British Government securities. Here, the leading favourite has been the Transport 3 per cent stock that was given to Home Railway proprietors in exchange for their interests. From 93¾, the lowest price touched this year, the stock rose until it reached 99½, the highest level since the issue was made. British Electricity 3 per cent stock has not been below 96 since it came out a few months ago, and the price at the present time is 100$\frac{13}{16}$. This was unaffected by a sudden reaction in gilt-edged prices, on Monday afternoon last, when Consols fell 10s. in ten minutes and the Transport stock went back to 99.

The Month's Changes

The most volatile stock in our price lists is, for the time being, British Electric Traction deferred. On the Thomas Tilling award, the price of B.E.T. deferred, rose from 1600 to 1960, and the present 1925 represents a rise of 325 points on the month. Tillings at 5$\frac{13}{16}$ are up 14s. 9d., and shares in other road transport companies have shot ahead during the period. Cable & Wireless ordinary, which at the end of July stood at 186, has been up to 207 during the past fortnight, back to 195, and is now 201; the 5½ per cent preference stock being a point to the good at 125½.

Plessey at 15s. are 2s. 6d. higher on the month, Cossor at 9s. are 1s. 9d. down. E.M.I., at 18s., are also easier and Decca at 17s. 6d. have lost 1s. 6d. Pye deferred at 26s. 3d. have gained 3s. 9d. Revo, 59s. 6d., have advanced 1s. 6d., Chloride Electrical Storage 2s. 6d. to 97s. 6d., Johnson & Phillips 1s. 9d. to 68s. 9d., Henley's 1s. to 25s., Vactric 1s. 3d. to 6s. 3d. The " heavy " group is generally firm: Babcock & Wilcox at 68s. 9d. are 1s. 9d. better.

Recent Issues

Hackbridge Cables 5s. ordinary remain round about issue price of 15s. 6d. Dealers report a succession of orders to sell the small amounts of stock into which allotments were split as a result of the overwhelming number of subscriptions to the offer. The 5 per cent preference, placed in the market at 22s. 9d., are quoted about 1s. above that price: they yield £4 4s. 3d. per cent and are covered, as to dividend, about eight times by earnings. Hackbridge & Hewittic 5s. ordinary stand at the placing price of 10s. 9d., with the new shares at 1s. 6d. premium on the price of 9s. 6d., at which they were offered to stockholders. Christy (Chelmsford) shares have done well for those who subscribed at par for the ordinary and 5 per cent preference shares last July: the quotations are respectively 22s. 6d. and 25s. Scottish Cables 4s. ordinary keep about 6d. below the figure of 23s. 6d. at which they were marketed; the 4½ per cent preference are 1s. higher at 23s.

Issues to Come

Hoover 5s. shares have reacted in what is coming to be considered the normal way in the event of a new issue, by falling from 41s. 3d. to 36s. 9d. since the announcement of the company's proposal to raise fresh capital. On last year's 40 per cent distribution, the shares are now on a yield basis of close on 5½ per cent. Some £800,000 is stated to be wanted in connection with the broadening of the business at home and abroad: the rises in the cost of stocks and equipment also call for additions to the permanent working capital. New shares are to be offered in the first instance to ordinary stockholders, any surplus being available to holders of the other classes of capital. The East African Power Co., which raised £800,000 preference capital last May, now proposes to increase the capital to £4½ million by the creation of a further two million shares. At 44s. 6d. the present shares are 1s. higher on the month.

G.E.C.

The General Electric Company has declared its usual dividend of 17½ per cent and the price of the shares is unchanged on the month at 85s. 9d. The company made a gross profit of £3¼ million and the surplus of the group is £1,750,000 net, which amply covers the dividend payment. It is of interest to recall that in the years 1932-34, inclusive, the company paid 8 per cent, raising the dividend in 1935 to 10 per cent and, by gradual degrees, to the 20 per cent paid in 1938 and 1939. The price of the ordinary shares touched 111s. 3d. two years ago, the highest for many years. The lowest during the past decade was 52s. 6d., ten years ago. G.E.C. are justly regarded as one of the " blue chips " in the industrial market.

Dividends Passed

Radio shares have suffered a relapse from their tentative recovery. Cossors have dropped 1s. 9d. to 9s., since the postponement of the half-yearly dividend due on the 6 per cent preference shares, which are down to 16s. 3d. The dividend was paid, although not earned, last year. The 2s. shares of Sydney S. Bird, a company largely concerned with radio equipment, fell from 5s. 9d. to 4s. after the decision to pass the interim dividend. Last year two payments of 15 per cent were made. Jerusalem Electrics at 18s. 9d. are 2s. 3d. down: payment of the dividend on the company's 7 per cent preference shares, due on 30th September, has been deferred. Palestine Electrics fell 3s. 6d. to 30s. on the passing of the dividend on the ordinary shares.

Electrical Investments

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 27 Sept. 1948	Month's Rise or Fall	Yield p.c.
Overseas Electricity Companies					£ s. d.
Atlas Elec. ..	Nil	2	14/-	..	2 17 2
Calcutta Elec. ..	6†	6†	33/9	−2/-	3 11 0
Cawnpore Elec...	13	13	40/-	..	6 10 0
EastAfricanPower	7	7	44/6	+1/-	3 3 0
Jerusalem Elec...	5	6	18/9	−2/3	—
Madras Elec. ..	8	5	37/6	..	2 13 2
Nigerian Elec. ..	12½	10	34/-	..	5 17 8
PalestineElec."A"	7†	Nil	30/-	−3/6	—
Perak Hydro-elec.	Nil	Nil	12/6	−6d.	—
Tokyo Elec. 6% .	—	—	42½	..	—
VictoriaFallsPower	19½	19½	7⅞	..	—
WhitehallInv.Pref.	—	6	25/6	..	4 14 1
Equipment and Manufacturing					
Aron Elec. Ord...	15	15	48/9	−⅛	6 3 0
Assoc. Brit. Eng.	12	12	32/6	..	7 7 8
Assoc.Elec.Ord...	15	15	71/6	−1/-	4 3 10
AutomaticTel.&El.	12½	12½	63/3	−6d.	3 19 1
Babcock & Wilcox	15	15	68/9	+1/9	4 7 3
Baldwin,H.J.(2/-)	25	25	9/9	..	5 2 7
British Aluminium	10	10	47/3	..	4 4 9
B.I. Callender's..	6¾	6¾	33/6	..	3 19 6
British Rola (2/-)	15	10	1/-	−3d.	—
BritishThermostat (5/-)	23½	23½	25/9	..	4 11 3
BritishVac.Cleaner (5/-)	20	20	12/3	..	8 3 4
Brush Ord.(5/-)..	—	—	6/6	+6d.	—
Burco (5/-) ..	35	35	24/6	+9d.	7 3 0
ChlorideEl.Storage	20	20	97/6	+½	4 2 0
Cole, E. K. (5/-)..	20	22½	15/6	..	7 5 2
Cossor, A. C. (5/-)	25	Nil	9/-	−1/9	—
Crabtree (10/-) ..	17½	17½	41/6	..	4 4 4
CromptonParkinson Ord. (5/-) ..	22½	22½	26/6	+6d.	4 3 4
De La Rue (5/-)	50	50	38/9	−9d.	6 8 10
Decca (1/-) ..	112½	112½	17/6	−1/6	6 5 6
E.M.I. (10/-) ..	8	6	18/-	−9d.	6 13 4
Elec. Construction	12½	12½	47/6	−⅛	5 5 1
Enfield Cable Ord.	7½	7½	35/-	+⅛	4 5 9
English Electric .	10	10	46/3	+6d.	4 6 7
Ericsson Tel. (5/-)	20†	20†	41/3	−2/-	2 8 6
Ever Ready (5/-)	40	40	36/6	+6d.	5 9 7
Falk Stadelmann	10	15	41/3	..	7 5 8
Ferranti Pref. ..	7	7	35/-	..	4 0 0
G.E.C. Ord. ..	17½	17½	85/9	..	4 7 5
GeneralCables(5/-)	25	50	37/6	..	6 13 4
Greenwood&Batley Hall's Tel. Acc. (10/-)	15	15	52/-	..	5 15 5
Heatrae (2/-) ..	10	10	12/6	−⅛	8 0 0
Henley's (5/-) ..	12½	12½	5/-	..	5 0 0
Hopkinsons ..	20	20	25/-	+1/-	4 0 0
Intl. Combustion (5/-)	22½	22½	95/-	..	4 14 6
Johnson & Phillips	37½	37½	41/3	+⅛	4 11 0
LancashireDynamo	15	15	68/9	+1/9	4 7 3
	22½	22½	5⅛	+⅛	4 9 3

Company	Dividend Previous	Dividend Last	Middle Price 27 Sept. 1948	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing *(Continued)*					£ s. d.
Laurence,Scott(5/-)	12½	12½	13/6	..	4 12 7
London Elec.Wire	10	10	45/-	..	4 9 0
Mather & Platt ..	11	11	50/9	−6d.	4 6 8
Metal Industries(B)	10	10	43/9	+6d.	4 11 3
Mid. Elec. Mfg. ..	35	35	8½	..	4 5 0
Murex	20	20	87/6	+⅛	4 11 3
Newman Ind.(2/-)	22½	22½	7/-	..	6 8 7
Plessey (5/-) ..	30	20	15/-	+½	6 13 4
Parsons C. A. ..	12½	12½	60/6	..	4 2 9
Pye Deferred (5/-)	25	25	26/3	+⅛	4 15 3
Radio & Tel. (2/-)	40	—	5/3	+3d.	—
Revo (10/-) ..	27½	27½	59/6	+1/6	4 12 10
Reyrolle ..	12½	12½	61/3	+⅛	4 1 8
Scophony (5/-) ..	—	—	1/6	−6d.	—
Siemens Ord. ..	7½	7½	33/-	+6d.	4 11 0
Strand Elec. (5/-)	12½	17½	9/6	..	9 4 2
Switchgear&Cowans (5/-) ..	10	20	16/6	..	6 1 3
T.C.C. (10/-) ..	15	15	32/6	..	4 12 4
T.C. & M. ..	10	10	43/6	−9d.	4 12 0
Telephone Mfg.(5/-)	9	9	9/3	..	4 17 3
Thorn Elec. (5/-)	25	25	18/9	..	5 6 8
Tube Investments	22½	25	6½	−⅛	4 1 9
Vactric (5/-) ..	Nil	Nil	6/3	+⅛	—
Veritys (5/-) ..	2½	5	4/-	..	6 5 0
WalsallCondnite(4/-)	70	70	55/-	..	5 1 10
Ward & Goldstone (5/-)	50	50	57/6	..	4 6 10
Watford (2/-) ..	15	15	5/9	+6d.	5 4 4
WestinghouseBrake	14	14	62/6	..	4 9 7
West, Allen (5/-)	10	10	9/9	..	5 2 7
Transport and Communications					
Anglo-Am. Tel.: Pref.	6	5⅝	118	−2½	4 12 0
Def.	1½	1½*	21½	−1	—
Anglo-Portuguese	8	8	30/-	−2/-	5 6 8
Brit.Elec.Traction: Def. Ord. ..	50	50	1925	+325	2 12 1
Calcutta Trams..	10	Nil	32/6	+3/-	—
Cape Elec. Trams	6	6	32/6	..	3 13 10
Cable & Wireless: 5½ Pref. ..	5½	5½	125½	+1	4 7 8
Ord.	4	4	201	+7	1 19 9
CanadianMarconi$1	Nil	4 cts.	10/-	−⅛	—
Globe Tel. & Tel.Ord.	5†	5†	45/6	+3/-	2 3 10
GreatNorthernTel. (£10)	15	12	21	−1½	5 14 3
Inter. Tel. & Tel.	Nil	Nil	20	..	—
Marconi-Marine..	7½	7½	30/6	..	4 18 3
Oriental Tel. Ord.	10	16	54/-	−1/-	5 18 6
Telephone Props.	6	6	17/6	..	6 17 2
Tele. Rentals(5/-)	10	10	10/9	..	4 13 0
T. Tilling ..	10	10	116/3	+14/9	1 14 6

* Dividend postponed.
† Dividends are paid free of Income Tax.

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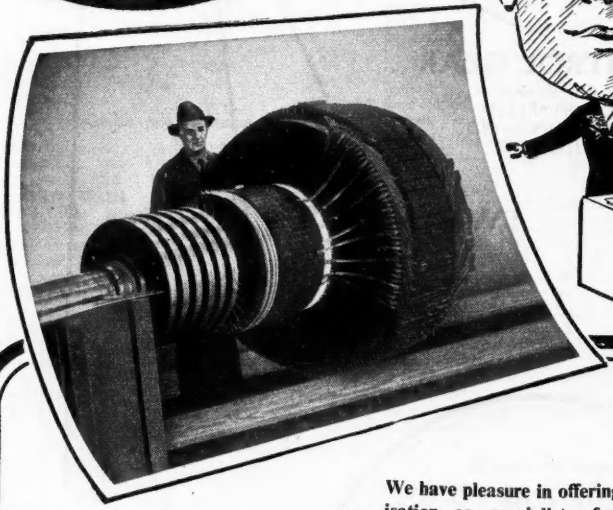

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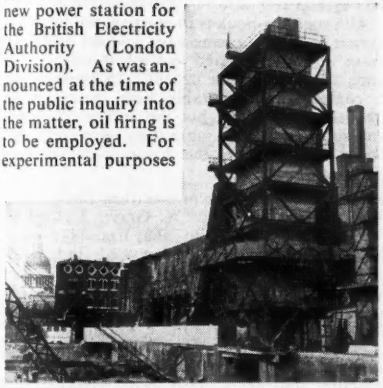
Progress at Bankside. Underground Station Reconstruction.

Alnwick.—OPPOSITION TO OVERHEAD LINE.—The Urban District Council has decided to oppose a plan by the North Eastern Electricity Board to erect an overhead line from Howling Lane, on the eastern side of the town, to a sawmill and farm in the Hulne Park area. The Council contends that the cable should be placed underground.

London.—ISLINGTON MERCURY LIGHTING.—The Borough Council has received consent from the Ministry of Transport to the carrying out of the proposed mercury lighting scheme in Holloway Road.

BANKSIDE GAS WASHING EXPERIMENT.—Site work is well in hand at Bankside (Southwark) for the erection of the new power station for the British Electricity Authority (London Division). As was announced at the time of the public inquiry into the matter, oil firing is to be employed. For experimental purposes



The site of the new Bankside station showing the experimental gas washing plant

a pilot gas washing plant has been built on the site for treating the gases from two of the oil-fired boilers in the present station.

Scotland.—TRANSMISSION LINES.—An Order has been made by the Secretary of State for Scotland confirming constructional scheme No. 11 of the North of Scotland Hydro-electric Board, which is estimated to cost £689,000. It provides for the erection of transmission lines to link up a point on the main lines at Keith, in Banffshire, to the Ferryhill generating station at Aberdeen for supplementing the city's supplies from existing steam plant in conjunction with hydro-electric power. Objections lodged against the scheme have all been withdrawn.

The first supply of electricity in the village of Bowmore, Islay, was switched in on 22nd September, being the first stage of the Board's distribution scheme for the island. Forty houses have been connected to the local network, which is supplied from a Diesel-engined station in the village. Another fifty premises are being wired and the famous round church at Bowmore is one of the buildings which will be provided with electricity. Work is well advanced on the distribution line from Bowmore to Port Ellen, the poles for which have been erected.

Overseas

New Zealand.—HOT SPRINGS DEVELOPMENT.—Mr. Robert Semple, Minister in charge of the State Hydro-Electric Department, announced last week that the power potential of New Zealand's hot springs may be harnessed. The Commissioner of Works recently returned from studying the development of the generation of thermal power at Larderello, near Pisa, and two Italian experts have been invited to visit New Zealand.—*Reuter* (Wellington).

TRANSPORT

Darlington.—PURCHASE OF TROLLEY-BUSES.—The Corporation has received sanction to borrow £22,590 for the purchase of six trolley-buses.

London.—STATION RECONSTRUCTION.—Work has restarted on the scheme for reconstructing the Central Line station at Liverpool Street to give better facilities for interchange between the Central and Metropolitan Lines. An additional booking-hall will be connected by a bank of three escalators to the Central Line platforms. It is hoped that the work, which will cost some £250,000, will be completed by the end of 1950.

Newcastle-on-Tyne.—NO AID FOR RATES.—The Ministry of Transport, in sanctioning higher trolley-bus, tram, and motor-bus fares, has informed the City Council that any surplus on the undertaking must not be taken to help the general rate fund but should be retained in a reserve fund for the benefit of the undertaking.

NEW TROLLEY-BUS SERVICE.—A circular trolley-bus service to Longbenton is to be started by the City Council about the middle of October. About thirty trolley buses will be used in the service and these are being manufactured by Northern Coachbuilders, Ltd.

Yorkshire.—TUNNEL FOR ELECTRIFICATION.—The new 330-yard tunnel at Thurgoland, near Penistone, which has been constructed to facilitate the electrification of the Eastern Region main line from Manchester to Sheffield and Wath, will be brought into use on Sunday next, 3rd October. Owing to the prevailing abnormal conditions, it has taken nearly two years to complete. The necessity for this new single line tunnel at Thurgoland arose owing to the difficulty in obtaining sufficient clearance for the overhead electrification equipment for the two lines in the old tunnel.

NEW BOOKS

Network Analysis : Stability of Power Systems

The Royal Institution. By Thomas Martin. Pp. 54, illustrated. Longmans, Green & Co., Ltd., 6, Clifford Street, London, W.1. Price 1s. 6d.

This booklet is one of the Science in Britain series published for the British Council. It is a revised edition of the historical account prepared by the general secretary of the Institution of the work of the two men whose combination of experiment with popular exposition has for one hundred and fifty years given the Institution its unique character and made its house in London one of the principal meeting places of learned men.

The example was set by Humphry Davy, the founder of electro-chemical science, followed by nearly half a century of inspiration by his successor, Michael Faraday, on whose chemical discoveries the dyestuffs industry is based and upon whose invention the electrical industry has grown. Some reference is included to the researches of Tyndall, Dewar and Bragg, whose work has sustained the remarkable tradition of the Royal Institution.—W.O.F.

A.C. Network Analysis by Symbolic Algebra. By W. H. Miller, A.M.I.E.E. Pp. 41; figs 37. Classifax Publications, 9, White Moss Avenue, Manchester, 21. Price 4s.

This little book is a useful and logical supplement to "The Symbolic Method of Vector Analysis" by the same author, which was reviewed on page 789 of the *Electrical Review* of 14th May, 1948. Although it contains so few pages the book is not, as one might expect, limited in its treatment of the subject. Together with its companion volume it should form an invaluable addition to the library of the student of elementary electrical theory. Commencing with a summary of the symbolic method, it continues to show how impedances and admittances are expressed in the complex form, giving a table of formulae forms. The author follows this with a concise treatment of typical problems involving the analysis of simple series-parallel combinations, concluding with delta and star connected circuits. On the whole the book is well balanced and it contains only that material which is essential to the engineering student.—R.P.

Power System Stability. By Selden B. Crary. Vol. II—Transient Stability. Pp. 329; figs. and index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 36s. in U.K.

In Great Britain stability problems ranked low in importance until recently, when overloading of plant and lines brought them into prominence. They have now assumed such proportions that all transmission engineers are bound to take an interest in them.

In this American book, the author provides an excellent survey of the basic principles underlying stability of power systems, his survey being supported by adequate first-hand experience. He assumes that the reader is familiar with his first volume on steady state stability and develops his material to cover the transient conditions encountered when a power system is disturbed by short circuits. His method of approach is to state the fundamentals of circuit analysis and then to work through the familiar two-machine case to the general case involving many machines with a complex interconnecting network. He deals specifically with the all-important subjects of generator stability characteristics, automatic voltage regulators, high-speed reclosing circuit-breakers and excitation system response.

Although the book is interesting and informative, it is by no means easy to read and only those who are prepared to work through it can hope to derive much benefit. In presentation it compares unfavourably with certain other treatises on stability, but the author's sincerity and solid knowledge more than counteract that factor. Altogether, the book is a first-rate publication.—C.W.M.

Principles and Practice of Electrical Engineering. (Sixth edition). By A. Gray. Revised by G. A. Wallace. Pp. 568; figs. 487; index. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Price 27s. in U.K.

The latest edition of this American book is likely to be of value to those wishing to obtain a broad view of the subject. While the general treatment has not in any way been changed, obscure statements have been clarified and practical applications modernized. The M.K.S. system of units has been introduced, but is not intended to replace the older systems which are still widely used. The treatment of three-phase circuits has been extended and the chapters on transformer theory have been almost entirely re-written. Among new topics are the amplidyne, ignition, tetrodes, push-pull amplifiers and fluorescent lamps.—R.P.

Questions and Answers on Refrigeration. By M. E. Anderson, A.M.I.MECH.E. Pp. 160; figs. 33; index. George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Price 5s.

This pocket-size manual does not pretend to do more than outline in a summary way the principles of the subject, mostly from the theoretical aspect. The majority of the answers are in the form of definitions. It will appeal most to the man who is just curious about "how it works."—W.O.F.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

GENERAL Electric Co., Ltd., G. H. S. Price and F. M. Williams (legal representative of S. V. Williams (deceased)).—" Manufacture of metal bodies." 603. 12th January, 1944. (608124.)

British Thomson-Houston Co., Ltd.—" Torque measuring devices." 2946. 22nd February, 1943. (607857.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Deposition of vaporizable substances." 3971. 3rd March, 1944. (608216.)

L. M. Ericsson Telefonaktiebolaget.—" Driving device for telecommunication instruments." 14286. 27th July, 1943. (608034.)

Igranic Electric Co., Ltd.—" Control of electric motors, driving elevators and other travelling devices." 15498. 13th August, 1943. (607860.)

Philips Balham Works, Ltd., and C. E. G. Bailey.—" Radio navigational aids." 20806. 25th October, 1944. (608220.)

Standard Telephones & Cables, Ltd., and M. L. Gayford.—" Electrical recorders and reproducers." 22061. 9th November, 1944. (608035.)

British Ermeto Corporation, Ltd., and S. H. Jones.—" Packing or sealing means for valve spindles, and the like." 23262. 22nd November, 1944. (607954.)

1945

Marconi's Wireless Telegraph Co., Ltd.—" Plural beam cathode-ray tubes." 15792. 31st December, 1943. (608227.)

Marconi's Wireless Telegraph Co., Ltd.—" Electron-discharge devices." 16035. 25th August, 1943. (608040.)

Fibres de Silice Silicami.—" Furnace for electrically melting silica and silica-containing glasses." 17024. 20th April, 1942. (608041.)

Telegraph Construction & Maintenance Co., Ltd., J. N. Dean and E. W. Smith.—" Submarine cables." 17329. 6th July, 1945. (608042.)

Unity Heating, Ltd., and J. M. Young.—" Electrical heating elements." 21992. 27th August, 1945. (607877.)

M. N. Yardeny.—" Electric follow-up systems." 24523. 21st September, 1945. (607879.)

Hoover, Ltd. (Hoover Co.).—" Suction cleaners." 27177. October 17th, 1945. (Convention date not granted.) (608238.)

British Thomson-Houston Co., Ltd., and B. E. G. Forsling.—" Starting and manœuvring of gas turbine plants for electric ship propulsion and the like." 27750. 22nd October, 1945. (607884.)

J. H. O. Harries.—" Electron beam valves." 29221. 3rd November, 1945. (608047.)

J. R. Tillman.—" Receivers of frequency- or phase-modulated signals." 30477. 14th November, 1945. (608241.)

W. W. Triggs (Akt.-Ges. Brown, Boveri & Cie.).—" Electric starting and generating arrangements in gas turbine driven ships." 30770. 16th November, 1945. (Addition to 592639.) (607970.)

Landis & Gyr Soc. Anon.—" Multipole electro-magnetically operated motor-protection switch." 31672. 25th November, 1944. (608243.)

Sperry Gyroscope Co., Inc.—" Electrical phase-discriminative or sense-discriminative demodulating systems." 32061. 2nd October, 1942. (608049.)

British Thomson-Houston Co., Ltd.—" High-frequency heating apparatus." 33034. 9th December, 1944. (608247.)

Akt.-Ges. Brown, Boveri & Cie.—" Electric tunnel furnaces." 34158. 31st October, 1945. (607975.)

Marconi's Wireless Telegraph Co., Ltd.—" Frequency measuring system." 35314. 20th April, 1944. (608253.)

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Metropolitan-Vickers Electrical Co., Ltd., and F. H. Belsey.—" Tracking sights and like arrangements." 173. 2nd January, 1946. (608256.)

Marconi's Wireless Telegraph Co., Ltd.—" Pulse generator and modulator systems." 192. 8th January, 1944. (608257.)

Sulzer Frères Soc. Anon.—" Control of engine-driven electric generators for vehicle or ship propulsion." 1234. 15th June, 1945. (607979.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Recording systems." 1652. 17th January, 1946. (608261.)

R. C. Mildner.—" Electric cables." 1721. 18th January, 1946. (608147.)

Philco Radio & Television Corporation.—" Wave-guide transmission systems." 1766. 15th August, 1944. (608262.)

General Electric Co., Ltd., and W. G. Branson.—" Electric filament lamps for pyrometers." 1782. 18th January, 1946. (608148.)

Marconi's Wireless Telegraph Co., Ltd.—" Electrical automatic tuning circuit arrangements suitable for use on high-frequencies." 4054. 9th February, 1945. (608265.)

Philips Lamps, Ltd.—" Source of rays comprising an electric gas-discharge tube and a luminescent layer." 4487. 5th June, 1941. (607910.)

Metropolitan-Vickers Electrical Co., Ltd., C. H. Flurscheim and W. G. C. Vance.—" Jacks, actuators and the like of the ball-thrust, screw-and-nut type." 4492. 13th February, 1946. (607912.)

British Thomson-Houston Co., Ltd., and J. G. Wellings.—" High reactance transformers." 4510. 13th February, 1946. (607987.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Capacitor switches." 4511. 13th February, 1946. (607988.)

C. A. Justesen.—" Device for the testing of electric installations." 4521. 13th February, 1946. (607992.)

Marconi's Wireless Telegraph Co., Ltd., and W. O. Agar.—" Radio and like instruments for use in high-frequency testing research and development." 4570. 13th February, 1946. (608005.)

B. Thomas (Engineers), Ltd., and E. Thomas.—" Truck type electric switchgear." 4604. 14th February, 1946. (608012.)

Standard Telephones & Cables, Ltd., and B. Secker.—" Impedance measuring devices." 4631. 14th February, 1946. (608016.)

Westinghouse Electric International Co.—" Electric steam irons." 4637. 10th February, 1945. (608017.)

British Thomson-Houston Co., Ltd.—" Dish washing apparatus." 4649. 23rd February, 1945. (608019.)

Westinghouse Electric International Co.—" Refrigerating apparatus." 4651. 6th February, 1945. (608057.)

British Thomson-Houston Co., Ltd.—" Thread guides." 4761. 24th February, 1945. (608093.)

Allmanna Svenska Elektriska Aktiebolaget.—" Means for voltage regulation between two taps of an alternating-current source." 4764. 13th March, 1945. (608094.)

Ferranti, Ltd., M. K. Taylor and R. S. Paulden.—" Super-regenerative radio receivers of the type associated with transmitting means." 4787. 15th February, 1946. (608103.)

Westinghouse Brake & Signal Co., Ltd., and A. H. B. Walker.—" Voltage regulating apparatus for alternating-current circuits." 4805. 15th February, 1946. (608108.)

Standard Telephones & Cables, Ltd.—" Voice frequency ringer." 4826. 21st February, 1945. (608117.)

H. E. Page.—" Power-driven dry shaver." 4836. 16th February, 1945. (608152.)

G. Ingrassia.—" Fluorescent tube feeder circuits." 4890. 15th February, 1946. (608164.)

Revo Electric Co., Ltd., and A. E. Felton.—" Means for securing the heating element of an electric fire or the like." 4925. 16th February, 1946. (608170.)

Automatic Coil Winder & Electrical Equipment Co., Ltd., and S. R. Wilkins.—" A.C. measuring instruments." 5007. 18th February, 1946. (608187.) " Multi-range electric measuring instruments." 5009. 18th February, 1946. (608189.)

Automatic Coil Winder & Electrical Equipment Co., Ltd., S. R. Wilkins and W. H. Attwood.—" A.C. measuring instruments." 5008. 18th February, 1946. (608188.)

Venner Time Switches, Ltd., and W. F. Horgan.—

"Price-change mechanism for prepayment meters and the like." 5027. 18th February, 1946. (608194.)

General Electric Co., Ltd., and C. R. Dunham.—"Electro-magnetic pumps." 5039. 18th February, 1946. (608197.)

J. Brennan.—"Ionization tubes." 5109. 19th February, 1946. (608268.)

Akt.-Ges. Brown, Boveri & Cie.—"Electrodes of automatic arc welding apparatus." 5130. 29th November, 1945. (608270.)

Ferranti, Ltd., and T. Kershaw.—"Enclosing means for electrical devices." 5157. 19th February, 1946. (608275.)

Murex Welding Processes, Ltd., E. C. Rollason and E. H. S. van Someren.—"Flux-coated welding electrodes." 5596. 22nd February, 1946. (608021.)

Philips Lamps, Ltd.—"X-ray apparatus." 6245. 19th June, 1941. (608282.)

R. C. de Holzer.—"Airtight inductor and transformer." 7401. 9th March, 1946. (607921.)

Self-Priming Pump & Engineering Co., Ltd., G. C. Meredew and J. A. McKean.—"Motor-driven pumps for liquids." 7690. 12th March, 1946. (608121.)

Eralite Manufacturing Co., Ltd., and E. J. Wray.—"Lighting fittings." 9626. 28th March, 1946. (607922.)

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Walsall Conduits, Ltd., and E. Gough.—"Electric tumbler switches." 2423. 27th January, 1947. (Addition to 597341.) (607932.)

Cornercroft, Ltd., and N. Rycroft.—"Electric lamp fittings." 6080. 4th March, 1947. (Addition to 584333.) (607934.)

Amended Specifications

Standard Telephones & Cables, Ltd.—"Ultra-high frequency electronic devices." (578586.)

General Electric Co., Ltd., & ors.—"Apparatus for producing flashes of light." (579920.)

New Codes of Practice

DRAFTS ISSUED FOR COMMENT

THE Codes of Practice Committee has published further Codes which were prepared by a Committee convened by the Institution of Electrical Engineers and issued as drafts for comment.

Consumers' Controls

Code 322.103.—"Installation of Consumers' Electricity Supply Controls for small Dwellings (for A.C. Systems)" recommends that the switches or circuit-breakers, fuses, meters and bell transformer together with the supply authority's sealing box, should be housed in a compact sheet-metal box (described in Appendix B of B.S. 1454), preferably recessed in the wall. Recommendations are also made for choosing the best location for the box and the most suitable type of components are listed and described.

Domestic Cookers

Code 324.301.—"Selection and Installation of Domestic Electric Cookers" includes descriptions of the various types of cookers, other than portable cookers. The relevant British Standards are listed with tables of loading and space requirements for free-standing cookers for various sizes of household and overall dimensions of inset cookers. Information is given on protective finishes, boiling-plates, grill boilers and grills, ovens, cooker control units, fuses and terminals. Inspection, testing and maintenance are also dealt with.

School Lighting

Code 324.102.—"Provision of Electric Lighting in Schools" primarily relates to new buildings but is applicable to the modernization of installations in existing buildings. It sets out the minimum satisfactory illumination for various purposes that can be achieved by the use and arrangement of tungsten filament or fluorescent lamps and shades suspended at minimum heights above the floor, taking into account the colouring of walls, floors and ceilings.

Effects which can adversely effect lighting efficiency are considered. A table shows the minimum illumination values for various rooms and purposes. The work to be done on the site is described. Recommendations are made on fittings in normal situations, in positions where there may be condensation or dampness, on the permissible weight of fittings with flexible conductors and on inspection, testing and maintenance. An appendix gives a typical layout of a classroom, the requirements for laboratories, workshops, assembly halls and gymnasia.

Lightning Protection

Code 326.101.—"Protection of Structures against Lightning" deals with the selection of equipment and the installation practice necessary to minimize risk of damage and covers structures with explosive or highly inflammable contents. The principles of lightning protection are described and zones of protection illustrated by diagrams for different heights of down conductors and buildings. The materials used are enumerated, British Standards numbers being given where applicable, and recommendations are made regarding sizes of sections for varying conditions.

Information given includes air terminations, roof conductors, down conductors, joints and bonds, earth terminations, earth electrodes, protection of inflammable roofs, fences and trees, overhead electric supply lines, telephone wires and radio aerials.

Notes on inspection and methods of testing with diagrams illustrate practical test methods. Drawings of joints in conductors give a guide to good mechanical practice and electrical continuity.

Copies of the Codes may be obtained from the British Standards Institution, at 2s. for each of the first three and 4s. for the fourth, post free.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Ashton-under-Lyne.—4th October. Housing Committee. Electric wiring in 32 houses. (See this issue.)

Australia.—BRISBANE.—17th December. City Council. 33-kV metalclad switchgear. (E.P.D. 40716/48. Com./893.)*

Bedlington.—Urban District Council. Conduit and electrical fittings for 47 houses at Westlea. W. Hall, surveyor.

Edinburgh.—29th October. North of Scotland Hydro-Electric Board. Complete electrical installations at Sloy power station and dam and other sites in the Loch Sloy project, covering lighting, heating, clocks, power, lightning protection, indications, etc. (See this issue.)

Egypt.—CAIRO.—7th December. Ministry of Public Works. Electric pumping plant and transformer station at Atf pumping station. (E.P.D. 39937/48. Com./737.)*

India.—22nd October. India Store Department. Transformers. (See this issue.)

Manchester.—11th October. Education Committee. Electrical installation at the Baguley Hall Primary School, Wythenshawe. (See this issue.)

New Zealand.—WELLINGTON.—State Hydro-Electric Department.—Five 50-kV, 500-MVA three-phase circuit-breakers and accessories. (Contract No. 97, closing date 7th December); and 1,000-MVA, 22-kV switchgear of the duplicate busbar indoor metalclad drawout type and accessories (Contract No. 98, closing date 14th December). (E.P.D. 40710/48. Com./853.)*

Portugal.—25th November. Lisbon Harbour Board. Twelve electric portal travelling cranes (from 3,000 to 10,000 kg loads) (E.P.D. 40657/48. Com./829.)*

South Africa.—BLOEMFONTEIN.—E.h.v., h.r.c. switchgear. (E.P.D. 40988/48. Com./886.)*

PRETORIA.—21st October. Union Tender and Supplies Board. Fifty metal rectifiers. (E.P.D. 40860/48. Com./887.)* Supply of 1,100 lightning protectors. (E.P.D. 40658/48. Com./885.)*

22nd November. City Electricity Department. Supply of 33-kV insulated cables. (E.P.D. 40245/48. Com./835.)*

JOHANNESBURG.—21st October. Department of Posts and Telegraphs. 1,600 timemeters. (E.P.D. 40861/48. Com./927.)*

10th November. South African Railway Stores Department. Low-voltage generator and oil filters. (E.P.D. 41154/48. Com./929.)*

Sheffield.—9th October. City Transport Department. V.h.f. radio equipment (one fixed and four mobile stations). (See this issue.)

Siam.—BANGKOK.—6th October. Department of Public and Municipal Works. Generator and engine for the waterworks of Nakorn Rajasima. (E.P.D. 41095/48. Com./925.)*

26th October. Supply of one 15-h.p., one 40-h.p., one 75-h.p. and two 5-h.p. motors for a paper making factory. (E.P.D. 40742/48. Com./883.)*

Uruguay.—MONTEVIDEO.—22nd October. Usinas Electricas y Telefonos del Estado. 49,500 fuse plugs. (E.P.D. 40920/48. Com./926.)*

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—Bungalows (68) for T.C.; borough engineer.

Barnes.—Factory extensions, Derby Road, S.W.14, Magnet Match Works; L. Farman & Partners, architects, 47, Richmond Park Road, S.W.14.

Benhar.—Pithead baths for Miners' Joint Welfare Council (£50,745); McLean & Co., builders, Wishaw.

Biddulph.—Houses (700), Braddocks Hey Estate, for U.D.C.; W. J. Venables, architect, West Road, Congleton, Ches.

Blackburn.—Infants' Department, Bentley Street, for R.C. authorities (£35,000); Rev. J. J. O'Connor, P.P., St. Joseph's, Audley.

Extensions to Union Engineering Works, Witton; Hindle, Sons & Co., Ltd.

Bristol.—Transit sheds, Avonmouth Docks; Port of Bristol Authority (chief engineer).

Burton-on-Trent.—Technical college, Manor Croft and Soho, for E.C.; G. Moncur, borough surveyor.

Cardiff.—Factory, Bute Terrace; Geo. Stanley, architect, 100, St. Mary Street.

Buildings for Government Departments, Cathays Park; Ministry of Works, Abell House, London, S.W.1.

Carmarthen.—Block for 50 patients at Pantglas Hall, for Welsh Regional Hospital Board; D. Garbutt Walton, regional architect, Offices of the Board, Cathays Park, Cardiff.

Cleland.—Maternity Hospital; Lanarkshire C.C., Motherwell.

Cosham.—Extensions, 29-31, High Street, F. W. Woolworth & Co., Ltd.; staff architect, 311, Oxford Street, London, W.1.

Coventry.—Omnibus garage, Leicester Street; Birmingham & Midland Red Omnibus Co., Ltd., Bearwood, Smethwick.

Garage, offices, canteen, and café, Priory Street, for Transport Committee; D. E. E. Gibson, city engineer, 1a, Warwick Row.

Cumberland.—Second section of plan for new secondary school at Wigton for the C.C.; county architect, 15, Portland Square, Carlisle.

Dagenham.—Houses (78), Blackborne Estate and Valentines Way, for B.C.; borough engineer.

Darlington.—Houses, Nickstream Lane, for the T.C. (£13,675); direct labour. Houses (24) in Shakespeare Road for the T.C.; borough architect, Central Buildings.

Houses (22) for workers of Patons & Baldwins, Ltd.; J. Laing & Co., Lingfield Lane.

Debden (Essex).—Development of new estate for houses (383 dwellings), for L.C.C.; W. J. Simms, Sons & Cooke, Ltd., building contractors, 76, Mount Street, London, W.1.

East Retford.—Houses (48), Hallcroft Estate; Vallance & Westwick, architects to the T.C., White Hart Chambers, Mansfield.

Eastwood.—Houses (200), Church View Estate, for U.D.C.; T. Cecil Howitt & Partners, architects, St. Andrew's House, Nottingham.

Edinburgh.—Reconstruction of Theatre Royal, for Edinburgh Varieties, Ltd.; Bowhill, Gibson & Laing, architects, 19, Manor Place.

Folkestone.—Houses (36) in six blocks, Horn Street Site No. 2; borough engineer, Municipal Offices, West Terrace.

Glasgow.—Garage, Maitland Street; Artee Motors, Ltd., 20, Grove Street.

Trolley-bus garage, Aitkenhead Road; Corporation Transport Department.

Flour mill and silo, Castlebank Street; Co-operative Wholesale Society, Ltd., 95, Morrison Street.

Grimsby.—Factory for Shire Trawlers, Ltd., Humber Street; F. A. Would & Co., Ltd., builders, Old Market.

Jarrow.—Factory for the Jarrow Welding & Boiler Co., Ltd., Ferry Street.

London.—CHISWICK.—Block of flats, Spencer Road; Greenwood, Richards & Partners, architects, 14, Sackville Street, W.1.

EDMONTON.—Central Depot, Deephams Farm site, for B.C.; borough engineer.

LEWISHAM.—Flats (101), in four blocks, Bromley Road, Catford, for T.C. (£160,000); Wates, Ltd., builders, London Road, Norbury, S.W.16.

WESTMINSTER.—Office block, Petty France; H. V. Ashley and Winton Newman, architects, 3, Verulam Buildings, W.C.1.

Mexborough. — County college, adjoining Schofield College; West Riding county architect, County Hall, Wakefield.

Newburn-on-Tyne.—Gear works factory for G. Angus & Co., Ltd.; G. Henderson, Boldon Lane, East Boldon, Co. Durham.

Newcastle-on-Tyne.—Dental clinic, New Bridge Street, for the City Council; city estate and property surveyor, Town Hall.

Extensions to Dame Allen School; Alex. Anderson, Ltd., Stanmore Road.

Norwich.—We regret that a note under this heading in our 10th September issue was erroneous. The 178 dwellings referred to are being constructed by the Norwich City Council —not the Norfolk County Council.

Orrell.—Houses (78), Moor Road, for U.D.C.; F. Butterfield, surveyor, Council Offices, Orrell Post, near Wigan.

Pontefract.—Extensions to Ackworth School for Board of Governors (£85,000); J. L. Denman, architect, 27, Queen's Road, Brighton.

Ripon.—Houses (28) on the Holmefield housing site; city engineer.

Rochester.—Primary school for Kent E.C.; county architect, Maidstone.

Rye.—Houses (32), Tilling Green Estate, for T.C.; Howes & Jackman, architects, 1, Verulam Buildings, W.C.1.

Salford.—Central omnibus station, New Bailey Street, Worsely Street and Quay Street, for City Council; W. A. Walker city engineer, Town Hall.

Scarborough.—Alterations in Prospect Road for the Scarborough Co-operative Society; T. W. Whipp, architect, 15, Valley Bridge Parade.

Scunthorpe.—Infants' school, Lincoln Gardens, for Lindsey C.C.; A. Ronald Clarke, county architect, Lincoln.

Seaton Valley.—Houses (34) at Seghill, for the U.D.C.; surveyor, Council Offices, Seaton Delaval, Northumberland.

Sheffield.—Departmental stores, The Town, Roberts Bros. (Sheffield), Ltd.; J. A. Teather & Hedfield, architects, Mazda Buildings, Campo Lane.

Shrewsbury.—County primary school, Monkmoor for E.C.; A. Guy Chant, county architect, County Offices, 5, Belmont.

Staverton.—School for Devon C.C.; county architect, Heavitree Road, Exeter.

Stoke-on-Trent.—County primary school, Rackmoor, for E.C.; city architect, Kingsway.

Stourbridge.—Houses (157), Norton Estate, for T.C.; G. N. Maynard, borough engineer.

Sunderland.—Alterations to youth centre, Fawcett Street, for the Y.M.C.A. (£20,000); S. W. Milburn & Partners, architects, Esplanade.

Upton (Birkenhead).—County primary school, Long Lane (£75,000), for Cheshire E.C.; county architect, The Castle, Chester.

Wembley.—Flats (60), Forty Avenue, for T.C.; borough engineer.

Weston-super-Mare.—Alterations, Bournville School (£51,500) for E.C.; S. W. Foster, Ltd., builders, Radstock.

Wimborne.—Maternity hostel, Stone Park site, for Wimborne & District Cottage Hospital; R. K. Brett, architect, 1, West Borough.

Worthing.—Houses (70) for R.D.C.; surveyor 15, Mill Road.